Developing the Content for a Sustainability Curriculum at The Ohio State University

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Honors Research Thesis

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ABSTRACT:

As one of the largest universities in the nation, The Ohio State University (OSU) has recently been recognized for several achievements in sustainability. Despite its national recognition, a recent annual OSU sustainability survey indicated that many OSU students are not as knowledgeable about sustainability concepts as the university would like. In response, university decision makers aim to further enhance student sustainability comprehension and awareness by creating an online curriculum that will reinforce the most essential concepts of sustainability.

This thesis project examined and recommended best content for this curriculum through a literature review and through a series of semi-structured interviews and iterative conversations with key sustainability stakeholders and educators at OSU. A participatory development process was used to identify and summarize the main sustainability definitions, concepts, and resources that the OSU sustainability community recommends as most important for inclusion in an OSU sustainability curriculum. It was found that Ecology, Biodiversity, Energy, Justice/Equity, Community, Growth, and Externalities, were among the top environmental, social, and fiscal stewardship concepts recommended. Critical Thinking/Bigger Picture, Systems Thinking, and Societal Change were the most commonly selected recommendations for sustainability as a whole. This research recommends a complex definition of sustainability to be included in the curriculum: "Sustainability is a condition that allows humans and other species to flourish and thrive in perpetuity within the carrying capacity of the earth, and in which individuals are not burdened unjustly by the actions of others. To achieve this sustainable condition, we must act in a way that perennially guards against significant risks to survival, which in part means finding a balance between the environmental, social, and economic components of a system. This balance is necessary if we are to flourish and thrive in the present without compromising the ability of future generations to do the same."

INTRODUCTION:

The Ohio State University is constantly evolving in order to become more competitive, more desirable, and more efficient. This state of evolution is what has earned OSU a spot in the top 20 public institutions in the nation[1]. As of recently, this national recognition goes beyond sheer academics; OSU has also received the Enviance Award for being a "national champion" of sustainability, an award which deems OSU's environmental program the strongest in the nation, and OSU was named national Game Day Champion in both 2011 and 2012 for a nation-leading stadium Zero Waste program. From this Zero Waste stadium to several sustainability student organizations to the formation of the President and Provost's Council on Sustainability, it is evident that concern for sustainability is growing throughout the university.

Most recently, OSU has been moving towards increasing attention to sustainability in the educational experience as well. This is a trend cropping up worldwide: many institutions are

[1] U.S. News & World Report's 2013 "America's Best Colleges"

beginning to require some aspect of sustainability in their curriculum, and several associations have been formed in support of this trend towards sustainability education (for example, University Leaders for a Sustainable Future). OSU currently has several sustainability courses, a sustainability-focused major, and other opportunities for inclusion of sustainability in the curriculum. However, OSU does not currently have an operational definition of sustainability, nor a university-wide understanding of what sustainability means to Ohio State specifically. This lack of a local definition makes it difficult to effectively communicate sustainability to students, and as a result, sustainability education at OSU is fragmented, specialized, and varied. Thus, as OSU becomes increasingly involved in sustainability education, the need to define the term and the concepts associated with it grows in urgency.

In response to this need, the OSU office of Energy Services and Sustainability (ESS) proposed the creation of a sustainability education module, which would identify a sustainability definition to be embodied by Ohio State, and would encompass all of the most important tenets of sustainability at Ohio State, emphasizing areas of environmental, fiscal, and social stewardship. In addition to providing an accessible, foundational knowledge of sustainability to the OSU community, the module will provide an overview of the many different sustainability initiatives at OSU, in order to provide students with a current vision of sustainability at Ohio State. In the context of this particular research project, the educational module is referred to as a "sustainability curriculum." The sustainability curriculum is defined as a single, voluntary, online course, made up of several components.

The objective of this research was to identify the most appropriate content for the Office of ESS' curriculum by researching the multiple sustainability definitions, goals, projects, and potentials at OSU. The research spanned a diversity of mandates and perspectives, and engaged OSU sustainability stakeholders and leaders in an iterative, participatory process in which they proposed and refined the curriculum content. It is important to acknowledge that the research reported here does not deliver a final curriculum—it simply distills a collectively recommended structure and basic content for the sustainability curriculum, drawing from the literature and from OSU's own sustainability experts. It is also important to note that the curriculum itself is seen as one potential starting point and catalyst to increase attention to sustainability in the university curriculum, but is by no means deemed sufficient to meet all of OSU's sustainability education goals. It may, however, serve as an impetus for further discussion regarding the sustainability definitions and concepts that are specifically prioritized by OSU. This research helped probe the deeper questions within the sustainability conversation, and produce consensus-based, local definitional concepts that are not only beneficial for student knowledge, but for OSU sustainability progress as a whole. The following sections will describe the need for such a curriculum, as well as the process for obtaining and recommending its content.

BACKGROUND:

Ohio State is among the largest universities in the nation. With nearly 60,000 students on the Columbus campus alone, the university leaves significant economic, environmental, and intellectual footprints. In recognition of this, Ohio State has been working to transform these footprints into positive impacts, and to consider the university's collective "handprint."[2] With the One Framework Plan (http://oneframework.osu.edu) and countless operational improvements, Ohio State has already committed to assuring sustainable management of physical campus operations. However, OSU has also acknowledged that more than just physical improvements are needed to increase our sustainability handprint, as "OSU's greatest impact on sustainability will be to inspire a new generation of global citizens" (Fiksel et al., 2012). With the complex challenges facing the world, such as those suggested by the recent release of the IPCC Climate Change Report (2014), OSU's commitment to graduating global citizens who are prepared to deal with these challenges could not be more appropriate. As the IPCC report states, complex challenges will put stress on both human and natural systems—and the decisions that societies make affect the outcomes of both systems. The university increasingly is committed to providing an education that includes a robust understanding of sustainability to help graduates positively influence human and natural systems. Ohio State's commitment to global citizenry means OSU graduates are not only prepared to get a job, they are prepared to be a positive force in the midst of a changing world.

In developing global citizens, Ohio State integrates sustainability into the educational experience of students in several ways. The Campus as a Living Laboratory initiative, which works to integrate campus operations into the classroom and research of the university, is one such example. This holistic integration allows students to make connections between the three realms of operations, classroom, and research, so that they have firsthand knowledge of OSU's endeavors and can critically assess sustainability at OSU from multiple perspectives.[3]

Pertaining to the curriculum in particular, the Faculty Learning Community on Sustainability Across the Curriculum (2011), and more recently the Faculty Senate Committee for Sustainability in the Curriculum (2014), have been created in order to examine how to both infuse sustainability into current courses and how to develop new courses. Additionally, several faculty members took the initiative to assess sustainability at OSU and provide recommendations based on current progress and future potential. This white paper, titled "Sustainability at The Ohio State University: Beyond the Physical Campus," recommends the integration of sustainability concepts into the curriculum and student experience. As a way to facilitate this, the paper also recommended that a sustainability education committee be created in order to oversee sustainability learning objectives and educational initiatives at OSU (this recommendation is

[2] The environmental "handprint" is a way of measuring the positive impacts individuals make on the planet, rather than just tallying negative impacts, as most "footprint" calculations do (handprinter.org).
[3] More information on the Campus as a Living Laboratory initiative can be found in the CALL repository here: http://kb.osu.edu/dspace/handle/1811/54587

now being fulfilled with the creation of the Faculty Senate Committee for Sustainability in the Curriculum).

Sustainability in the curriculum is currently being put into practice in several areas on campus, the most notable being the recent creation of a sustainability-oriented major: Environment, Economy, Development, and Sustainability (EEDS). EEDS was created in 2012, and in just two years has become the fastest growing major at Ohio State, generating enrollment of over 150 students. EEDS is teaching a multi-disciplinary and integrated approach to sustainability, as it requires courses that span from Business Administration to Rural Sociology. In addition to the EEDS major, there is an EEDS minor, as well as over 90 areas of study in energy and related environmental issues. As of Autumn 2013, freshmen get the additional opportunity to learn basic sustainability concepts through the First Year Experience (FYE) Sustainability Series. This is a new offering inspired by both students and staff, to educate first year students on the basics of sustainability at Ohio State and ways in which they can get involved.

Other approaches to sustainability across the curriculum have been explored, including a push to create a sustainability General Education (GE) requirement at OSU during the Quarter to Semester transition in 2012. However, due to the magnitude of the transition and the time and resources that a new GE would demand, this addition was not a realistic priority. This barrier to sustainability integration is characterized by Fiksel et al. as an effect of institutional inertia, which makes introducing substantial changes into existing administrative policies and procedures difficult and time consuming, particularly at an institution as large as OSU (Fiksel et al., 2012). Another significant barrier was that if a new GE was created, it would take the spot of a current GE being offered. Many departments were not willing to give up their own GE offering (which would ultimately detract from that departments funding), so even if time and resources were not a barrier, there was significant departmental resistance to a new sustainability GE. Additional barriers to curriculum change could have also influenced this decision, such as funding for implementation, and traditions in teaching (Haigh, 2005), as well as faculty disinterest and communication challenges (Fiksel et al, 2012). Though the GE requirement was not implemented, the concept generated enough support that it is still being advocated for by sustainability leaders at OSU two years later.

In order to assess the environmental and sustainability knowledge of Ohio State students and identify areas for improvement, OSU's Environmental and Social Sustainability Lab has also taken the initiative to develop an Assessment of Sustainability Knowledge (ASK) survey. This survey, first conducted in 2012, was sent out to the OSU undergraduate population in the hopes of gaining an understanding of sustainability knowledge on campus. In addition to a series of cultural, environmental, and behavioral self-assessment questions, there were 16 questions that assessed an individual's knowledge of environmental, social, and economic conditions. These questions included topics such as sustainable development and the causes of pollution. Of the 16 questions asked, the average score among respondents (n= 1,389) was 69% (with a survey response rate of 14.3%). Respondents in this study trended towards rating themselves as

"environmentalist," suggesting that this level of knowledge is likely an upper bound of sustainability knowledge across all OSU students (Koontz et al., 2012). Given Ohio State's commitment to sustainability, the initial score of 69% serves as an indicator to OSU that more work needs to be done to give students a solid understanding of sustainability concepts. The survey was conducted again in 2013 with a few additions; however, information beyond the number of responses (n=2,621), is not yet available. Assessment of the 2013 data (set to take place in Summer 2014) will allow for comparison across time in sustainability knowledge, which may speak to the effectiveness of certain programs, courses, and initiatives across campus. This is an example of why employing knowledge assessments is a necessary practice for successful sustainability education; they enable the university to better understand where improvements can be made, they help identify gaps in knowledge, and allow for literacy comparisons to be made among disciplines. The innovation of OSU's ASK survey has gained national recognition; nearly 30 institutions have requested to use the survey to measure knowledge at their own institutions (Zwickle, Koontz, Slagle, & Bruskotter, 2014).

The Association for the Advancement of Sustainability in Higher Education (AASHE) Sustainability Tracking, Assessment and Rating System (STARS) additionally recognizes the role of sustainability efforts by awarding STARS credit to universities that employ knowledge and literacy outcome assessments (STARS Technical Manual 2.0 p. 34).

Many of the efforts above gained support and inspiration from OSU's participation in the American College and University Presidents' Climate Commitment (ACUPCC), which is an agreement signed by OSU in 2008 (and by over 600 college and university presidents since 2006) to become climate neutral by 2050. A significant portion of this commitment entails "making sustainability a part of the curriculum and other educational experience for all students" (ACUPCC, 2007). Ohio State is achieving that through its Climate Action Plan (CAP), which calls for integration of sustainability into the university by way of academic promotion and curriculum change. The AASHE STARS ranking system also pushes OSU towards higher sustainability performance in a similar way, as two measures of success in this system are sustainability curricula and sustainability literacy.

Clearly, including sustainability in the educational and curricular experience of students is not a new idea for Ohio State; the university has been working towards it for years. However, the effectiveness of these efforts has been limited by the inability to provide students with a unified vision of how OSU in particular defines sustainability concepts. The curriculum recommended in this research is meant to correct this limitation by providing a clear and uniform picture of foundational sustainability concepts at OSU to any interested student, faculty, or staff member.

Developing a more robust definition of sustainability at OSU will also strengthen the impact of OSU's sustainability efforts as a whole. The lack of clarity in definitions across campus lends to disunity among current sustainability initiatives, and can impede involvement altogether; one OSU administrator suggested that some departments may be hesitant to engage in OSU

sustainability questions/efforts due to the lack of a more serious, robust definition at OSU. It is clear that as OSU continues to build on its sustainability platform, maintaining cohesion, effectiveness, and involvement will require a more serious conversation, which explores a unified vision of what sustainability means to OSU specifically. This research addresses questions of sustainability in a responsible way, in order to improve sustainability efforts at OSU.

There are several characteristics that make this curriculum an appropriate avenue for sustainability integration, the most compelling one being its flexibility. The barriers to large-scale curriculum change discussed previously (size, funding, institutional traditions) are less prevalent with a voluntary and not-for-credit sustainability curriculum like the one developed here; this kind of curriculum requires little administrative approval, significantly less demand for structural change, and the political, economic, and logistical tensions that could arise from a voluntary online course are minimal. This course is a way to provide students with a solid foundation of sustainability concepts with less of the associated "red tape." At a university as large as Ohio State, there is a significant time and resource lag between ideas, actions, and results; this is an immediate way to increase sustainability awareness among all of our students. Ideally, this educational module will also be a starting point for the more widespread and better integrated sustainability education and literacy efforts that Ohio State has demonstrated a strong interest in achieving.

METHODS:

Like other universities, Ohio State is still in the early stages of developing its sustainability programs. In order to enhance these programs and more explicitly support curricular developments and research related to sustainability, it is prudent that OSU sustainability leaders generate a better understanding of how sustainability pertains to OSU in particular. As such, methods in this study were chosen to build and summarize consensus around basic sustainability concepts. The guiding framework for this research was Participatory Development (PD), which can be defined as "promoting the involvement of people in the planning and implementation of development efforts as well as in the sharing of their benefits" (Tufte, 2009). PD is one method of enhancing collaboration so that there is a sense of investment and ownership in the final product, which is a necessary factor for a sustainability curriculum to be effective. For instance, literature shows that curriculum creation is an iterative process among stakeholders that "must include brain-storming, summarizing, editing, commenting, redrafting, etc." (Elliot et al., 1993). At Ohio State, collaboration is especially important due to the siloed nature of its sustainability initiatives. By encouraging participation and collaboration through PD, the goal was to encourage cooperation among diverse stakeholders and reduce inherent feelings of competition between departments (Elliot et al., 1993). This method was also chosen in order to avoid time and resource barriers, as the iterative process of interviews and recommendations largely took the place of what may otherwise have required a series of conferences to obtain (Elliot mentions that "even if representatives are open to such proposals for a change, usually no one can commit

the resources" to it (Elliot et al., 1993)). PD allows for the interviewees to significantly contribute to the curriculum development, without the responsibility of coordination, compilation, and analysis that may deter them from being a part of the process. Lastly, interviewing university personnel by way of the PD approach helped the results remain as relevant as possible to the OSU community. The term "sustainability" has multiple definitions and applications, so the degree to which more general sustainability concepts would match up with the sustainability ideals and initiatives at OSU was unknown.

Recognizing the evolving nature of the field of sustainability, the central idea behind this research was not to develop content that would be final or definitive information; rather, it was to open up a conversation and identify with confidence a set of recommendable concepts. The participatory development approach is most consistent with these goals.

Sample Selection

The interviewees in this study were comprised of a purposive sample of faculty, staff, and students who possess high sustainability literacy, have stakes in the sustainability conversation, and have expertise to support their recommendations. Gathering information from individuals who have kept up with OSU's sustainability efforts resulted in obtaining very rich and relevant information. In conversation with sustainability staff in ESS and OEE, twenty-nine individuals were identified as being sustainability stakeholders who could contribute to this conversation, and of those twenty-nine contacted, twenty responded to outreach and participated in the interview process.

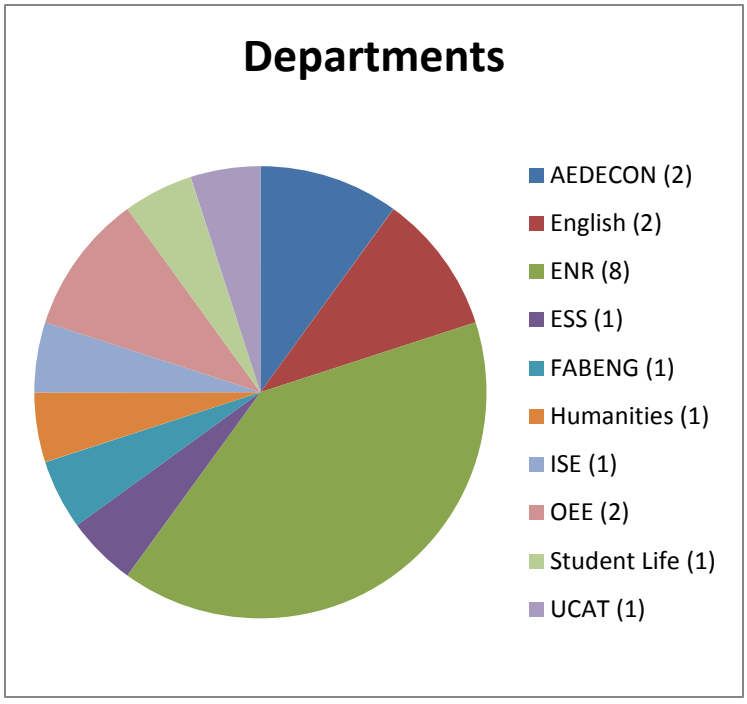

Figure 1: Departments represented in interview sample

Ten departments/offices were represented in this interview sample (shown in Figure 1): Agricultural, Environmental, and Development Economics (AEDECON); English; Environment and Natural Resources (ENR); the Office of Energy Services and Sustainability (ESS); Food, Agricultural, and Biological Engineering (FABENG); Humanities; Industrial Systems Engineering (ISE); the Office of Energy and Environment; Student Life; and the University Center for the Advancement of Teaching (UCAT). Of the twenty interviewees, one was a doctoral candidate, two were lecturers, two were associate professors, four were assistant professors, three were full professors, and eight were staff members (serving as departmental directors, program managers, etc.).

The snowball method was additionally employed in selecting the interview sample. Because this research was done in a setting where interest, involvement, and collaboration often overlap, this method was particularly useful, as it led to interviews with several individuals not originally on the interview list.

Interview Process

Data was gathered using semi-structured interviews. While semi-structured interviews follow a specific set of questions, interviewees are allowed to deviate from the initial question and explore other topics they find appropriate. Because sustainability is such a complex concept, additional side conversations were inevitable, and often times were equally insightful. This method allowed for more honest and candid responses, which contributed to thorough content.

Initial contact was made with the interviewees by way of a preliminary e-mail, explaining the research project and requesting the respondents' time for an interview. Interviewees were provided with the list of questions before hand, in the event that they wanted to prepare for the conversation. At the beginning of each interview, background information was recorded for each participant, including position title/specialization, duration of employment at the university, and years of involvement in sustainability. This information can be used later to identify potential connections between sustainability responses and background variables such as specialization. Interviews ranged from 60-90 minutes. Interviewees were asked the following questions which were produced by the Office of Energy Services and Sustainability:

1) What is your personal definition of sustainability?
2) What do you think are the most important tenets of environmental stewardship, social stewardship, and fiscal stewardship?
3) What is OSU doing about each?
4) How can students get involved in each?

5) What could OSU be doing better in terms of sustainability as a whole, and in terms of each section of stewardship?

The interviewees were then asked to recommend any other sustainability stakeholders at OSU who might provide additional insight. Employing the snowball sampling method was one attempt to make sure multiple perspectives were represented.

The interviewer captured the responses to the questions by typing them on a laptop by hand as the questions were asked, generating detailed summary notes of each interview. Interviews began in June of 2013, and continued on the basis of interviewee availability through December 2013.

Data Analysis

Interview results ranged from 3 to 7 full pages of text. Because of the nature of the semi-structured interview, responses came largely in conversation; in some cases, this produced straight-forward, direct responses to the interview question. In others, specific answers to questions had to be identified within the larger discussion.

The first step in analyzing the responses was to review the content for spelling and grammatical errors. Next, the interviews were analyzed to identify the text from the interview that specifically answered each individual question—this text was highlighted by bold font. This document was saved as the full-length summary of interview content.

A second document was created for each interview which listed only the bolded key responses from the full-length summary, thus condensing each interview into its essential core concepts. This document was the only document referred to when recommending content for the curriculum. Both documents were sent back to the interviewee via e-mail, and it was explained that the shorter document was a summary of the interview, which highlighted responses that were likely to be included in the curriculum rating/recommendation process. The original document was provided so that participants could refer back to it if they had any concerns about how the interview was summarized, or how the bullet points were distilled from the full interview. This gave interviewees an opportunity to indicate if the summary had been paraphrased incorrectly, or to flag items they thought should be included in or removed from the summary list. Respondents were also invited to provide additional thoughts upon reflection. According to Elliot, this “brain-storming, summarizing, editing, commenting, redrafting, etc.” is what lends success to curriculum creation of any kind (Elliot et al., 1993). Indeed, creating the opportunity for additional dialogue proved to be an essential component in obtaining accurate data; 10 interviewees responded with clarification, edits, or additional thoughts which were then incorporated into their interview summary. Many interviewees also responded with no changes, stating that the summary was a good representation of their thoughts. This process helped to ensure that every interviewee was satisfied with the way their responses were represented. This

approach was taken under the assumption that when individuals feel they have a say in what is being created and taught, there is wider acceptance and endorsement for not only the outcome but also the continuation of the curriculum. In a sense, this participatory research methodology was intended to make the curriculum itself a more sustainable endeavor by gaining the support and engagement of key OSU stakeholders who will likely be involved in promoting and maintaining the curriculum.

Once the interviewee feedback was received, a third document was created that compiled all of the bold concepts from each interview by question (i.e. all summary responses to question 1 were grouped together, all summary responses to question 2 were grouped together by tenet, and so forth). Similar and significantly overlapping responses to each question were then further condensed and grouped, yielding a final set of summarized responses to each question. This finalized list contained all the concepts that were to be considered and ranked by the interviewees to inform the final recommendation of concepts to be included in the curriculum (see Appendix C).

The responses for questions 3 and 4 (what is OSU doing about sustainability, and how can students get involved) were straightforward and easily quantifiable due to the straightforward nature of the questions. However, the responses for questions 1, 2, and 5 displayed a great deal of conceptual diversity and complexity, making them difficult to focus into a concise list of recommendable content. Thus, a rating system in the form of an online survey was employed to better focus the content around the most collectively supported concepts. In developing the wording for the survey, the similar groupings mentioned above were re-summarized with language designed to retain the meaning of the individual responses, and the number of interviewees who mentioned each re-summarized point was tallied and printed after each, so that interviewees had an idea of which concepts were most frequently mentioned. Once the survey material was developed, the survey was created using SurveyMonkey. The participants were asked to rank the responses of interview questions 1, 2, and 5, which were the three most subjective interview questions:

- What is your personal definition of sustainability?
- What do you think are the most important tenets of environmental, social, and fiscal stewardship?
- What could OSU be doing better?

Additionally, an unexpected trend within the interviews demonstrated that the idea of "sustainability as a whole" was important to the interviewees, therefore a question was added to the survey pertaining to that concept as well:

- What do you think are the most important tenets of sustainability as a whole?

For the first part of the survey regarding sustainability definitions, each person was asked to rank

the responses in order of importance (with one being the highest) according to their own belief, as well as how they felt it could best be communicated to students. Anticipating the possibility that there could be a difference between what the interviewees valued themselves and what they thought should be emphasized in an introductory, online curriculum, respondents were asked to rank both. Additionally, in order to acknowledge that sustainability is not cut and dry (and perhaps interviewees would have no absolutes), participants were also asked to include a threshold of definitions that they saw as imperative to be included in the curriculum in some way. This allowed for them to rank definitions but still indicate if they valued multiple definitions for use in the sustainability curriculum.

For the second part of the survey, interviewees were asked to indicate the most important tenets of environmental, social, and fiscal stewardship, which were separated by respective category. Next, they were asked to indicate the most important tenets of sustainability as a whole.

Finally, interviewees were asked to indicate which responses for "what OSU could be doing better" were most important.

For the first question only, the rankings were established by calculating a weighted distribution average of each sustainability definition, in which low numbers were representative of high importance, and vice versa. Essentially, this measured the number of times each definition got ranked 1-9, and then averaged that number and converted it into a percentage. The remaining questions did not require ranking, so results were determined based on how frequently each item was chosen.

Having interviewees evaluate each response was helpful in getting a more focused and consensus-driven foundation for content recommendation. This also provided a more quantitative means of assessing the data. Once all responses were in, the content which accrued the highest ratings was recommended for the curriculum. The survey was open for three weeks, and generated a response rate of 61%.

FINDINGS AND DISCUSSION:

Findings

The results of the survey have been graphed and are shown below. Underneath each graph is a concise description of the graph’s findings. Each graph can be viewed in more detail, along with the complete survey and survey results, in Appendix D.

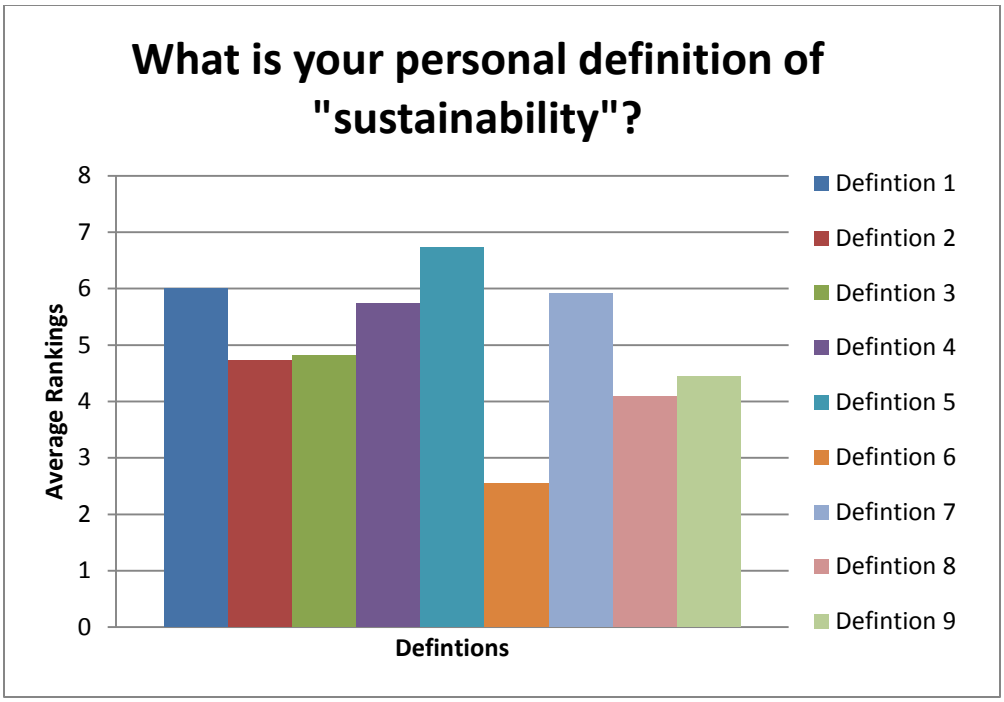

Figure 2: Definitions of sustainability

Definition 5: Sustainability is a condition that allows humans and other species to flourish and thrive in perpetuity within the carrying capacity of the earth and in which individuals are not burdened unjustly by the actions of others.
Definition 1: Brundtland Commission Report's definition, which implies meeting the needs of the present without compromising the ability of future generations to meet their own needs. However, there was also mention of that definition needing more
Definition 7: To Keep in Mind the Triple Bottom Line, or variations thereof (Sustainability can be separated into three areas: the environmental, social, and economic components. There should be a recognition that you need all three components, and the nexus of those is where you are sustainable and can meet the needs of each system over the long term)
Definition 4: Continued Existence (Sustainability is about identifying social, technical, economic, and political systems and structures that guide humanity in a way that will ensure our long term survival. Whatever we do, we have to make sure that we exist tomorrow, because ultimately, you can't do anything sustainable unless you're here
Definition 3: To Maintain (Sustainability is using the mix of resources that are available at that time to maintain the ecosystems, economy, and society at certain level, and to maintain our standard of living
Definition 9: To Be Conscious and Caring (Sustainability is about caring about neighbors, the environment, and future generations. It is about improving the quality of life for everybody)
Definition 8: To Balance (Sustainability is about the balance of different forces. We have to identify why and how we are out of balance in order to determine how to get things in balance for sustainability)
Definition 2: Contrasting Strong vs. Weak sustainability, where weak sustainability is simply not depleting our resources, and strong sustainability is not only not depleting resources, but improving our stock of resources as well
Definition 6: To Preserve (I think of sustainability in terms of how we can preserve the biodiversity on earth now and still encourage the organisms that are living on it—whether that may be humans, insects, fish, etc.)

As demonstrated by the graph above, definition 5 ("Sustainability is a condition that allows humans and other species to flourish and thrive in perpetuity within the carrying capacity of the earth and in which individuals are not burdened unjustly by the actions of others") was ranked highest, on average, by the participants, with a score of 7.2. More detailed information on the ratings of the remaining 8 definitions can be found in Appendix D. Respondents were also asked to include a minimum threshold of definitions to be included in the curriculum. There was an

average minimum threshold of approximately five definitions.

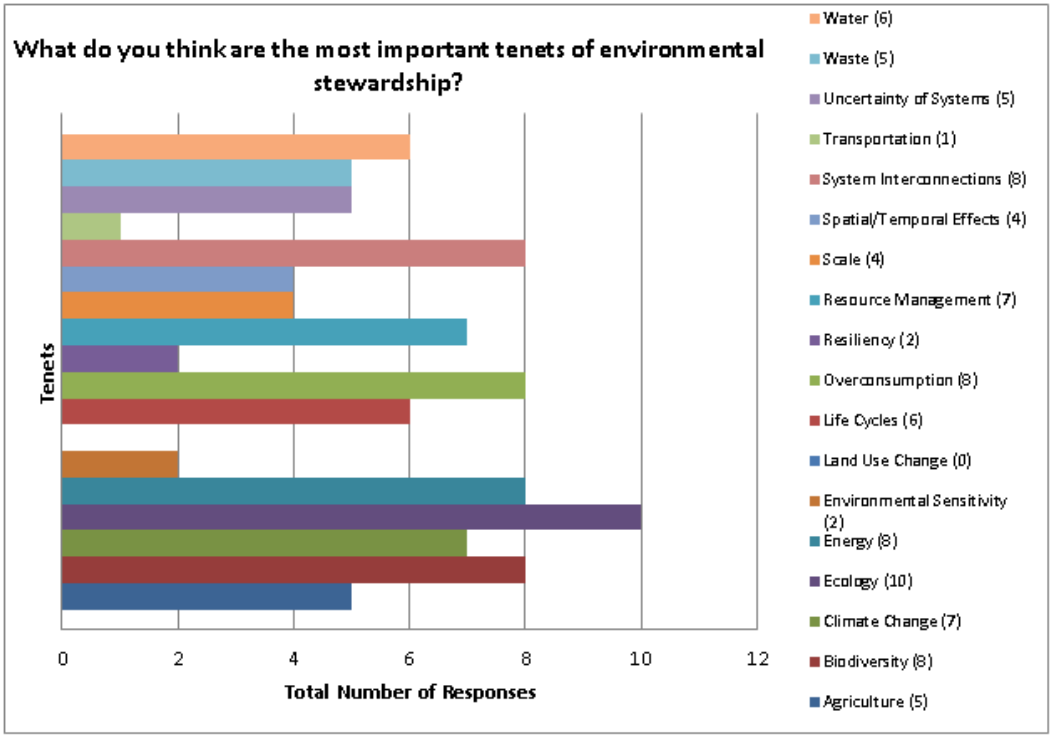

Figure 3: Important tenets of environmental stewardship

Ecology, Biodiversity, Energy, Overconsumption, System Interconnections, Climate Change, Resource Management, Water, and Life Cycles were the most commonly selected environmental stewardship tenets.

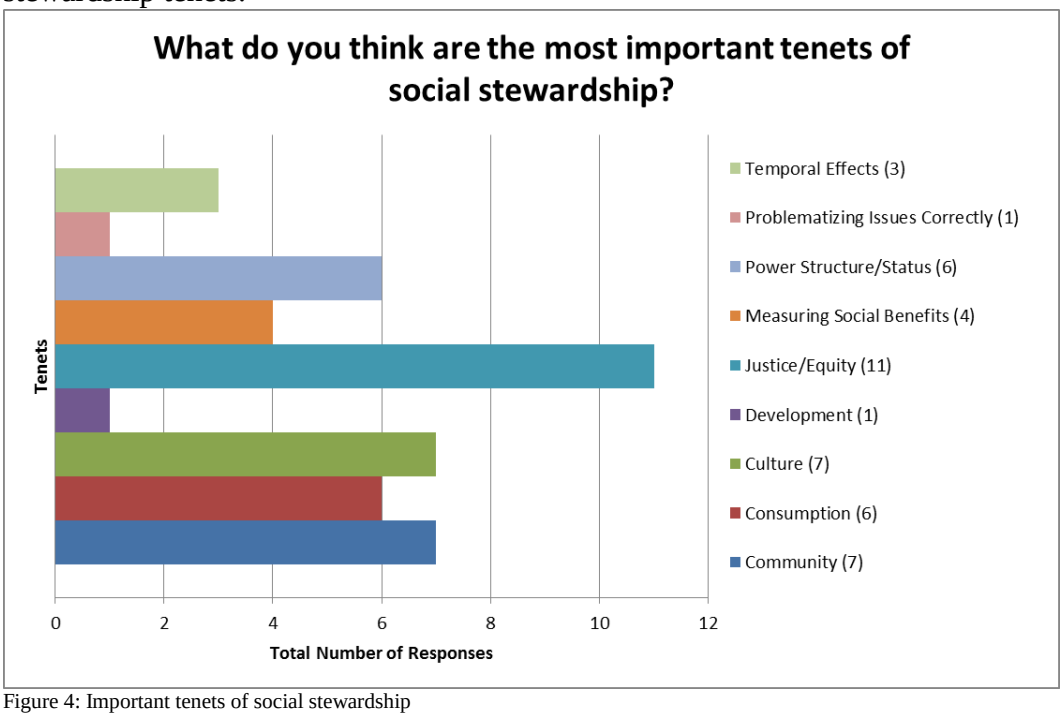

Figure 4: Important tenets of social stewardship

Justice/Equity, Community, Culture, Consumption, and Power Structure/Status were the most

commonly selected social stewardship tenets.

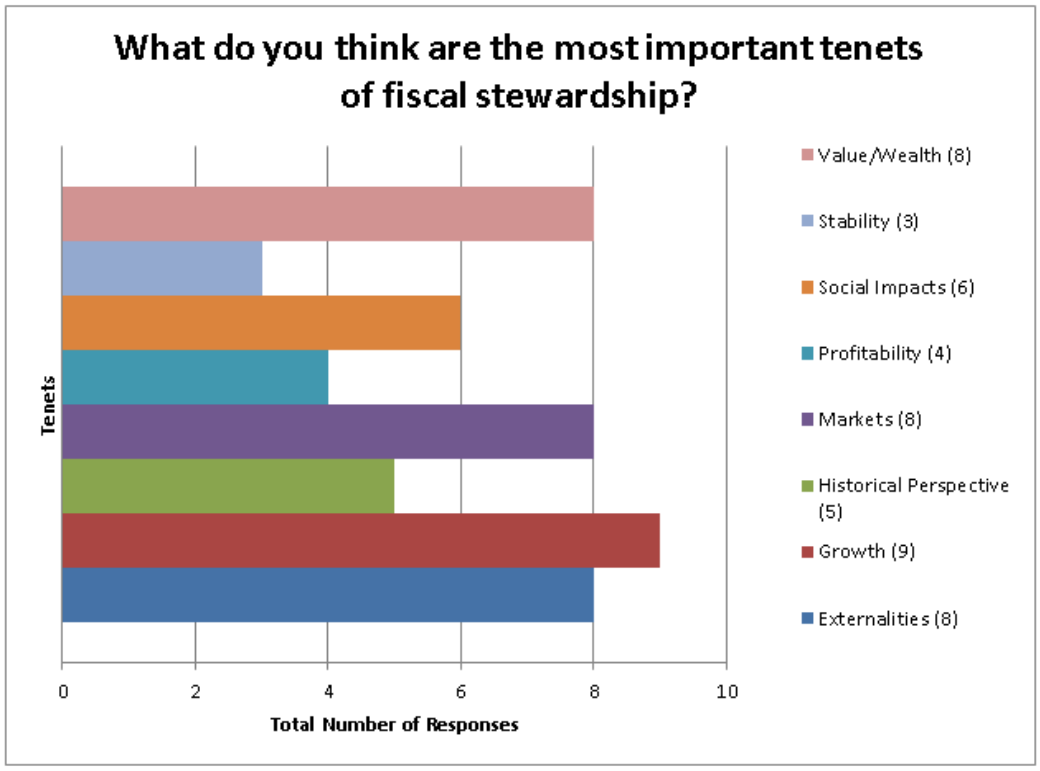

Figure 5: Important tenets of fiscal stewardship

Growth, Externalities, Markets, Value/Wealth, and Social Impacts were the most commonly selected fiscal stewardship tenets.

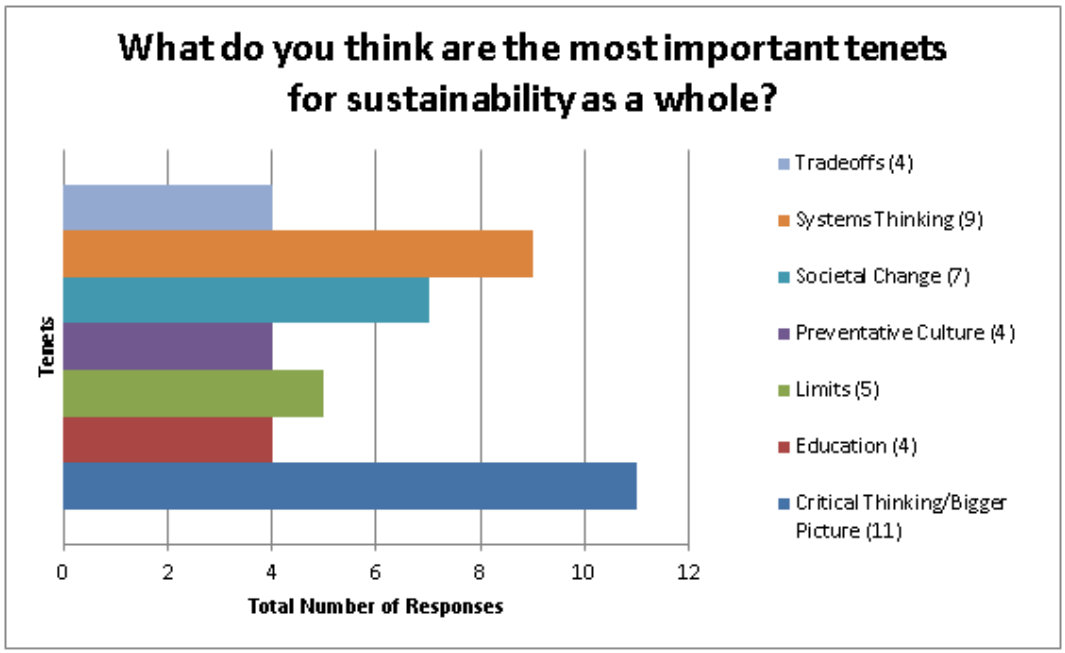

Figure 6: Important tenets for sustainability as a whole

Critical Thinking/Bigger Picture, Systems Thinking, and Societal Change were the most commonly selected recommendations for sustainability as a whole.

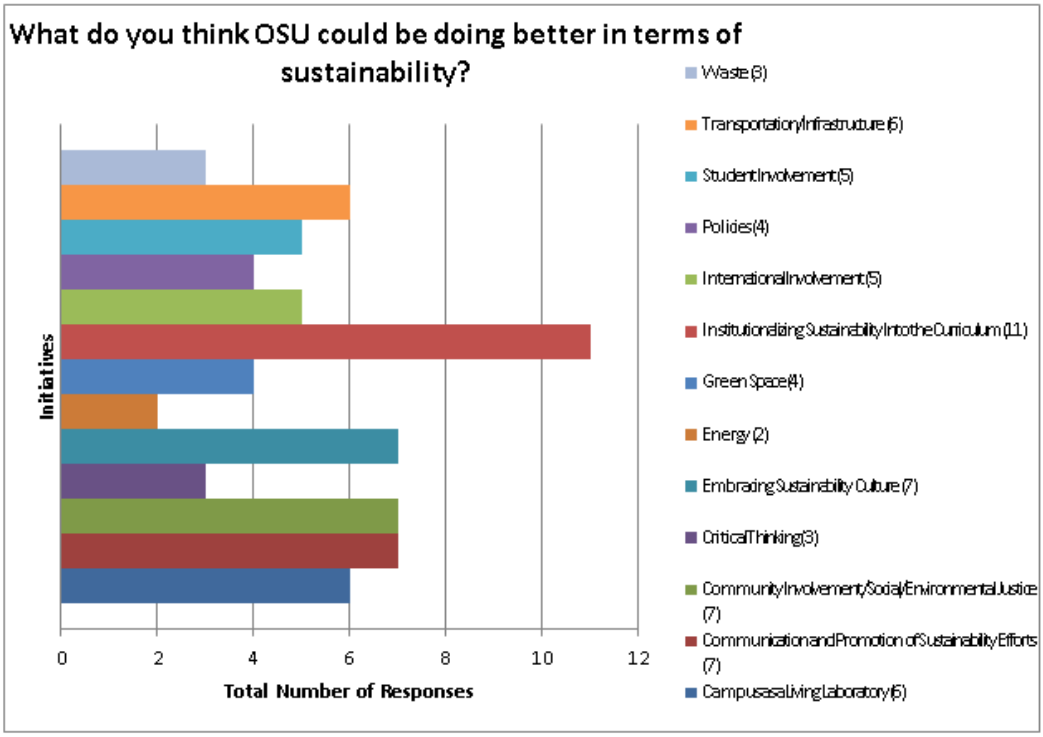

Figure 7: Recommendations for what OSU could be doing better

Institutionalizing Sustainability Into the Curriculum was by far the most commonly selected area for improvement.

Based on the recommendations of many of Ohio State's key sustainability stakeholders, the proposed content for a sustainability curriculum is as follows (also replicated in Appendix A). For brevity's sake, only the responses prioritized by at least 50% of respondents have been included here, in order of ranking. The full results of the survey can be found in Appendix D. The full documentation of each question's responses can be found in Appendix C.

<u>The curriculum should focus on the following tenets of environmental stewardship:</u>

- Ecology (Ecosystem Services, Ecological Bottom Line, Cycles, etc.)
- Biodiversity (Biodiversity (Trophic Levels, Species Interactions, etc.)
- Energy (Energy (Production, Extraction, Use, Alternatives, etc.)
- Overconsumption (Consumer Culture, Buying Local, Planned Obsolescence, etc.)
- System Interconnections
- Climate Change
- Resource Management (Sustainably Managing Resources, Tragedy of Commons, etc.)
- Water (Access, Cost, Runoff, Pollution, etc.)
- Life Cycles (Where Products Come From/End Up)

<u>The curriculum should focus on the following tenets of social stewardship:</u>

- Justice/Equity (Environmental Justice, Social Justice, local and international examples, etc.)
- Community (Importance of Community/Building Strong Communities)
- Culture (Different Cultures Perceive Sustainability Differently)
- Consumption (How Our Consumption Affects Others)
- Power Structure/Status (Political Economy, Fundamental Cause Theory, etc.)

The curriculum should focus on the following tenets of fiscal stewardship:

- Growth (Reevaluating Growth and Progress)
- Externalities (Prices Reflecting Total Cost, Properly Valuing Resources, Price Signals, Internalizing Externalities, etc.)
- Markets (Markets and Consumer Incentives, Redistributive Mechanisms, Subsidies, Cap and Trade, Rebound and Substitution Effects)
- Value/Wealth (Redefining Wealth, Valuing Social and Environmental Factors Equally)
- Social Impacts (Capturing Social Welfare in the Market, Effect of Externalities on Social)

The curriculum should focus on the following tenets of sustainability as a whole:

- Systems Thinking (Students Need to Think of the System as a Whole, Everything is Connected)
- Critical Thinking/Bigger Picture (Critically Assessing Claims, Looking at the Bigger Picture, Paying Attention to the Impact of Your Actions, Recognizing Challenges of Sustainability-- It Is Not All Black and White)
- Societal Change

The curriculum should highlight the following sustainability initiatives at OSU:

- Educating Future Global Citizens (EEDS major, SENR courses, FLC)
- Energy (25% of OSU's Electricity Generated by Wind, Energy Efficiency Building Standards)
- Waste (Zero Waste Initiative, Composting and Recycling Programs)
- Community Involvement (Weinland Park, Community Gardens)
- President's Climate Commitment
- Research (Around 400 Faculty Researchers in Energy, Environment, or Sustainability)
- Student Support (Encouraging Student Leadership in Sustainability ex) CocaCola Grants)

The curriculum should highlight the following areas for student involvement:

- Student Organizations
- Chosen Area of Study (EEDS, Sustainability Courses, Incorporating Concepts in Any Discipline)

- Research (In Energy, Environment, or Sustainability, CocaCola Sustainability Grants)
- Lifestyle Changes (ex. Altering Consumption Patterns)
- Volunteer Opportunities (Zero Waste, BuckiServe, etc.)

Areas in which OSU could improve:

- Institutionalizing Sustainability Into the Curriculum (We should integrate sustainability into teaching university-wide, so that sustainability is a component of courses taught in all different majors. A General Education course or a multidisciplinary seminar related to sustainability would be helpful)
- Communication and Promotion of Sustainability Efforts (OSU could do a better job at promoting its many programs and initiatives and then demonstrating in a clear way their connection to a larger sustainability commitment)
- Community Involvement/Social/Environmental Justice (The concept of environmental justice and integrating sustainability into surrounding areas could be improved; we could do a better job at focusing on who is outside the borders of the university, by getting more deeply involved with community work and enhancing our social fabric)
- Embracing Sustainability Culture (Instead of just meeting the bar, we need to exceed it; OSU could be a leader in developing the next set of standards for sustainability. We have signed on verbally to the sustainability discourse, we just need to get to the point where sustainability is our culture)

Discussion

The Participatory Development process used in this research has provided a clearer sense of what OSU sustainability stakeholders find to be important concepts and tenets of sustainability for an introductory sustainability curriculum at OSU. Like all complex topics, however, initial questions often lead to additional questions (many of which are beyond the scope of this study, but are discussed further in the Implications for Future Research Section). During the interviews, responses were more often in the form of a conversation than a clear-cut answer—which simply reinforces the connotation of complexity and ambiguity often associated with "sustainability." Due to many factors, including the semi-structured interview method, interviewee's interest and investment in the topic, and sustainability's multifaceted meaning, the majority of responses were peppered with qualifications, explanations, and at times with skepticism. Thus, while the results described above provide a helpful starting point to develop a sustainability curriculum, there are several remaining questions as well as some emergent questions that merit additional exploration. Much of this is not reflected in the curriculum, but there is valuable insight to be gained by examining the further comments and questions in the interviews which may provide a deeper lens with which to view sustainability. Common feedback for each question is discussed below, and quotations from interviewees are used to illustrate the discussions.

1. What is your personal definition of sustainability?
   "Sustainability has multiple cultures and approaches and dimensions, there's not one exact path or one way to look at it."-Participant

Very few respondents had a ready definition of sustainability that they were completely satisfied with. Some were dissatisfied with the term itself, characterizing it as a buzz word that is "sort of meaningless," vague, abstract, uninspiring, and even polarizing. Others had no definition at all, while others had multiple. The consensus among all respondents was that sustainability is a complex word which is not easily broken down or defined. As one interviewee stated, sustainability is even defined differently among members of the same discipline. Consequently, developing one definition that is supported by disciplines across the university is a difficult task. This raises the question of whether it is beneficial to define it at all; and feedback from the survey varies here. While there was one definition that scored highest, on average, among the participants, many were hesitant to commit to just that one definition. In fact, nine of the eleven respondents indicated multiple definitions being of importance, with an average "minimum threshold" of five (the range of minimum definitions varied, from one interviewee setting the threshold at one, to two interviewees setting the threshold to include all nine definitions). The fact that only one participant was satisfied with providing a single definition in the curriculum argues for an alternative approach to simply using the highest rated definition. Perhaps there is a need for an expanded definition of sustainability, in which several definitions are listed, or concepts of several are combined into a string of related statements.

In exploring the possibilities for including multiple definitions in the curriculum, a graph of the ranked definitions can be compared with a graph of the definitions that appear in minimum threshold lists. We see that in addition to definition 5, definitions 1, 7, and 4 are clearly priorities in terms of both ranking and threshold for inclusion in the curriculum:

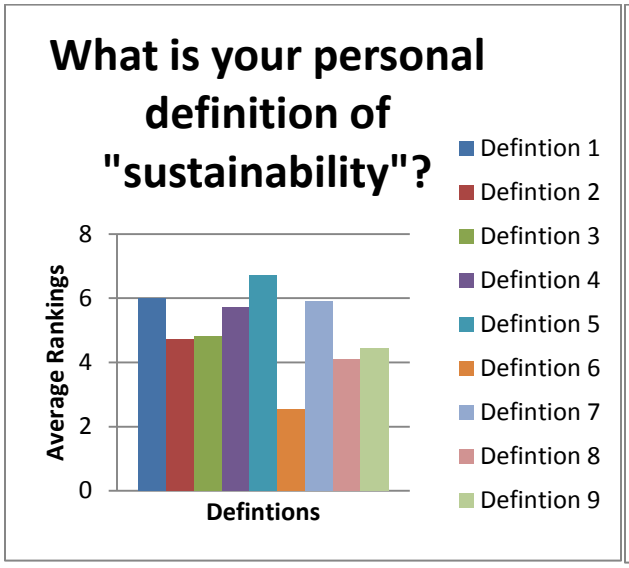

Figure 8: Definitions of sustainability

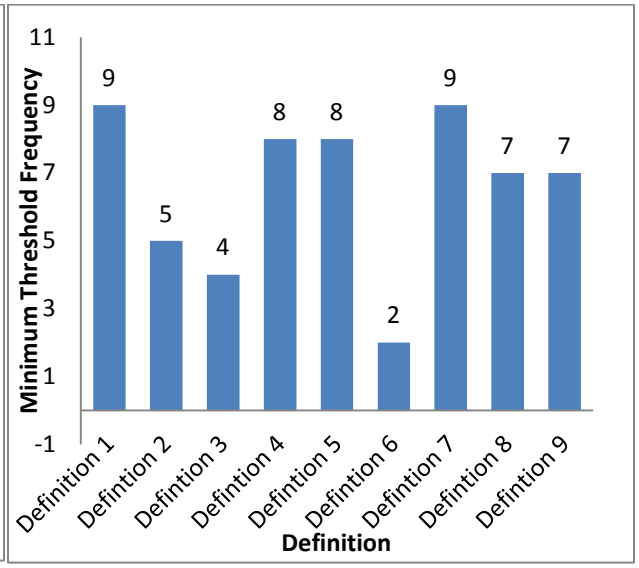

Figure 9: Minimum Threshold Frequency for Sustainability Definitions

This analysis beyond simply the top ranked definition alludes to the possibility that perhaps narrowing in on a single definition of sustainability is not as beneficial for our understanding as considering and debating its multiple meanings. However, one interviewee did caution the practice of endorsing multiple definitions at Ohio State, suggesting that while sustainability is defined in a variety of similar ways, OSU should be united in the way it is defined here. It is true that a common complaint among interviewees is that OSU is a "multi-headed monster" when it comes to sustainability. Perhaps having too many definitions would only contribute to this chaos, by overwhelming students and diluting the sustainability mission at OSU. It could be that the optimal solution is somewhere in between, as suggested by one interviewee: *"I wouldn't suggest deluging students with definitions, and I would not prescribe the "correct" one; rather expose them to various definitions for them to arrive at what is their personal definition."*

Given this feedback, this research recommends one comprehensive definition which combines the top four ranked definitions.[4] A single expanded definition such as this acknowledges the need for OSU to identify with one local definition, while still including essential concepts from other favored definitions. Because we seek to make the most thorough recommendations possible for definitions to be considered in the sustainability curriculum, definition 5 is listed primarily; however, concepts from definitions 1, 7, and 4 are also included as a part of the extended definition:

"Sustainability is a condition that allows humans and other species to flourish and thrive in perpetuity within the carrying capacity of the earth, and in which individuals are not burdened unjustly by the actions of others. To achieve this sustainable condition, we must act in a way that perennially guards against significant risks to survival, which in part means finding a balance between the environmental, social, and economic components of a system. This balance is necessary if we are to flourish and thrive in the present without compromising the ability of future generations to do the same."

One objective of this research was to obtain a definition of sustainability that OSU could adhere to, as well as operationalize in reporting sustainability programs in annual scoring by AASHE STARS. However, as demonstrated through this discussion, how OSU will (or should) define sustainability is clearly a topic still up for debate, and invites a continued conversation. The above recommended definition (also replicated in Appendix A) could serve as an impetus for a more broadly discussed decision on how to define sustainability at OSU.

2. What do you think the most important tenets of environmental stewardship, social stewardship, and fiscal stewardship are?
   "They're all integrally related, and to me, that's the basic tenet of sustainability. It goes

[4] Beyond the top four definitions, there is a discrepancy between the next highest ranked definition (definition 3) and the next most frequently mentioned within the thresholds (definitions 8 and 9)—so recommending any definitions beyond these four cannot be done with equal confidence.

against the basic fundamental tenet of sustainability to separate the three because they're interdependent."

Nearly every interviewee responded to this question with the assertion that the three categories cannot (and should not) be separated. Instead of describing their importance separately, the focus seemed to be on how they function together. Therefore, a strong recommendation made by many interviewees was to provide a "systems integration" section within the curriculum, emphasizing the interconnections that exist within these three realms of sustainability. An example of this could be with the concept of food:

Environmental	**Social**	**Economic**
Production	Unequal access	Government subsidies
Stresses on land	Food deserts	Externalities

It is difficult to consider the environmental implications of large-scale food production (which often include soil erosion and decreased productivity of the land) without considering the economic structure that encourages it (government subsidize large scale farms, making food seem cheaper than it really is, leading to more production and further environmental degradation). It is difficult to consider either of those without considering the social impact. Mass-produced food (which is often environmentally degrading) is cheaper (because of government subsidies and poor quality) so lower quality food becomes the only option for lower socioeconomic status individuals. They purchase cheap food because they are in a food desert, and the cycle continues.

Indeed, the interrelated nature of these three elements was so apparent that it was difficult to categorize the tenets appropriately. For example, one interviewee mentioned the concept of water as an environmental tenet, however, water access was mentioned by another interviewee as a social issue as well. This was not an isolated case; often the same concept was mentioned in the discussions of environmental, social, and fiscal stewardship. Another example of such concepts was energy (environmental and socioeconomic effects of production, externalities). One interviewee expanded on this topic saying, *"you have to step back and look at the system. If we stop burning coal, then the price of electrical energy would quadruple and then we would impinge on the social aspect of sustainability when we bankrupt people. We can't look at these factors in isolation.. we have to look at them all as a system."* Thus the interaction between environmental, social, and fiscal elements of sustainability proved to be unavoidable even just on paper.

Feedback for this section also included suggesting alternatives to the triple bottom line, one being the "nested rings" approach (The Natural Step), where instead of representing sustainability with the standard triple bottom line, it is instead demonstrated by three nested rings, where society is within the environment and economy is within society. It was suggested that this way of modeling neutralizes the business stigma that is often associated with

sustainability today. “Scale, equity, and efficiency” was another alternative suggested to the triple bottom line. There was additional feedback regarding the labeling of the sections: “economic” was preferred over “fiscal,” and several interviewees discouraged the use of “stewardship” in the social context, because it has a connotation of managing social systems, which can be problematic and unwise. Comments such as these emphasize the complex nature of sustainability questions, and suggest that a range of philosophical and ethical preferences exist within the sustainability discourse. These comments reveal a dimension of depth that is valuable to a thoughtful sustainability discussion.

3. What is OSU doing about each?
   “If I were going to talk about our sustainability efforts, I'd say there needs to be more of a critical approach.”
   “I think we are probably more rhetorically active than actually active. But we are improving and could certainly improve much more.”

As the survey results indicate, the majority of interviewees were largely content with what OSU is doing in terms of sustainability, particularly for its size, and acknowledged that the university is moving in the right direction. However, a handful of interviewees did question the authenticity of Ohio State’s commitment to sustainability, suggesting that some initiatives are geared more towards being “feel good” projects or saving money, and less towards addressing critical sustainability issues. There was no question among all interviewees that OSU is doing a great deal in terms of sustainability, but there was the suggestion that some of OSU’s priorities are misplaced, and more resources are spent on the “window dressing” than on acting (for example, one interviewee described a biking experience on campus: *“I look over and there's a massive banner about green sustainable construction. I'm the only bike sitting there with no bike lane, and I ride up to the [building] and the bike rack is gone. I feel like our priorities are not necessarily in the right place when it comes to sustainability. We talk about being sustainable but we don't create the means for it to actually work”*). Despite OSU’s progress in sustainability, to some interviewees there still seem to be inconsistencies in regard to the university’s public support and endorsement for sustainability and the meaningful action being taken.

In terms of naming examples of OSU’s involvement, not one person drew a blank when listing off environmental initiatives. However, there was notably lower awareness regarding OSU’s involvement in social stewardship, and even less regarding fiscal stewardship. This indicates that project promotion and awareness is an area where Ohio State has the opportunity to improve, not only among students, but among sustainability leaders as well. It could be that some of the actions described as “window dressing” above reflect an attempt to better communicate what OSU is doing in these areas—which appears to be necessary to some degree.

4. How can students get involved in each?
   “It’s important for students to realize that whatever they’re passionate about, there’s someone here that will support that.”

"Be curious. Ask questions. Do something. And share it with somebody else."

There was an overwhelming consensus among interviewees that there is little shortage of opportunities for students to get involved-- students simply have to find what they're interested in. Beyond this, there were three main types of involvement that were referenced. The first type of involvement was through established sustainability avenues, such as student organizations, coursework, and on-campus initiatives related to sustainability. These involvement opportunities were repeatedly cited by interviewees. The second type of involvement referenced similar opportunities (student organizations, coursework, etc.), but put emphasis on the fact that they did not have to be associated with sustainability for students to make sustainable impacts within them-- "*Regardless of what they're doing, they can challenge themselves about how to integrate sustainability principles into whatever they're passionate about*." An example of this might be students challenging professors to demonstrate the sustainability of whatever it is they're teaching. The third type of involvement acknowledged the notion of sustainability in an even less bounded sense; several interviewees said students could act sustainably just by paying attention to the impact of their actions; by being critical thinkers; by asking questions about where our products come from; by caring about neighbors. For many interviewees, getting involved in sustainability is as simple as engaging in meaningful conversations with those around you. For these sustainability leaders, sustainability is a lifestyle, a way of thinking, and an avenue for being conscious and informed citizens.

5. What could OSU be doing better, in terms of sustainability as a whole, and in terms of each section of stewardship?

Overall, there was positive feedback regarding OSU's sustainability initiatives. However, most interviewees did acknowledge that there is capacity for more; whether that be integrating sustainability into the curriculum (100% of interviewees supported this), or enhancing its role in the culture of Ohio State. While the list of suggestions for improvement may seem daunting, that does not necessarily reflect poorly on Ohio State's sustainability performance. It should be noted that no interviewee responded to this question with a simple charge to "recycle more." Ohio State is already doing a great job of that, and as has been outlined in this paper, has made great strides in other areas related to sustainability as well. The university has already made improvements in recycling, waste, physical operations, energy, etc. Because of that, the remaining options for improvement get harder and more complex. This is a good problem to have. Ohio State is an institution with the resources, the momentum, and the minds to make incredible handprints. This feedback is an acknowledgement of that—a call to raise the bar yet again, and continue making worthwhile improvements towards a sustainable future.

6. Sustainability as a Whole

One question that was largely overlooked in this research pertains to recommendations for sustainability as a whole. Interviewees were asked to consider the three "pillars" of sustainability

in isolation and make recommendations for what students should know about each. However, they were not asked to provide insight on what students should know about the larger concept of sustainability itself. Most interviewees answered this question throughout conversation and through their responses to other questions. As a result, several reoccurring concepts were mentioned throughout the interviews that spoke to sustainability in a larger sense, as general recommendations for the promotion of a sustainable culture. This trend within the data was recognized and a question was created in the survey which asked about the most important tenets of sustainability as a whole. The two that were the most commonly chosen on the survey (and seemed to be most frequently woven within the interviews) were critical thinking and systems thinking. Quotations are used to demonstrate the importance interviewees placed on each.

Critical thinking

"The sustainability issue can easily become a value-laden topic, so the university's role should be based on critical thinking and evaluation."
"People need to think more critically about what sustainability means."
"I don't really have a strong feeling about the content in those sections, it's more about the problem solving process."
"There are so many myths surrounding sustainability, so critical thinking is key. Students need to analyze—don't jump on or off the bandwagon. Be a skeptic."

Systems thinking

"Students need to think of the system as a whole."

"We will have a suboptimal solution if we break the idea of sustainability down into subcomponents."

"The biggest thing students should be aware of is systems thinking, which means that everything is connected to everything else, so changing anything has consequences farther than what you may have predicted."

The feedback on systems thinking in particular echoes the feedback given in the tenets section, which was the idea that the three pillars of sustainability being considered in this study cannot be viewed in isolation. It is clear that there are larger systems at play which must always be taken into consideration when thinking about sustainability.

The emphasis on critical thinking and systems thinking seems to speak to the "bigger picture" of sustainability. As the data suggests, interviewees placed value on teaching students about concepts like energy and resource management, however, that does not equate to giving students the false impression that all green energy is good and all logging is bad. On the contrary, interviewees were clear that students should be able to make critical, unbiased assessments. This means understanding that some green biofuels take more energy to make than it takes to get oil, so it could be a loss to the environment, as one interviewee pointed out. It also means

understanding that stopping logging might help the spotted owl but it might also result in economic and social destruction—meaning it may not be that sustainable, as pointed out by another interviewee. Across the board, there was a clear consensus that because sustainability is so multi-dimensional, it is essential that it be evaluated in a critical and holistic way. As one interviewee stated, *"we don't want to brainwash students into doing good actions. We want them to come away with critical thinking, and that may lead them to good actions, but the important part is the thinking that got them there."*

Limitations

As might be expected, interviewee's responses tended to reflect their specialization or focus area within the university. The sample was intentional, developed in consultation with ESS and Office of Energy and Environment (OEE) sustainability staff who recommended key sustainability faculty and staff from a range of departments across the university including those who have been most involved in university sustainability efforts; however, this was limiting in that the resulting data did not come from a representative sample of campus expertise in its entirety. Faculty and staff from other units associated with sustainability, such as City and Regional Planning or Geography, were not interviewed, and as a result our findings may not include the wider perspective that might be gained from these units.

Similarly, the findings may have been limited by the scope of the question set produced by ESS. Because the interviewees were expected to respond to the provided interview questions, the responses were somewhat pre-conditioned and narrowed as a result. This was a limitation in that there may have been important pieces of the conversation left out. This limitation was in part overcome, however, by employing the semi-structured interview method, in which a larger conversation often provided answers to questions that weren't initially asked (for example, interviewees provided responses to the unasked question "what do you think are the most important tenets for sustainability as a whole?"—as illustrated in the Discussion section above).

While the semi-structured interview method was effective in opening up the conversation and attempting to reduce pre-conditioned or narrowed responses, this also added a level of complexity to the data analysis, particularly in quantifying and categorizing the data. Because a semi-structured interview allows for open-ended questions, this meant an answer to a question was often touched on in the previous or the following question's discussion. For example, in one interviewee's response to Question 1 (what is your personal definition of sustainability?), the concepts of preserving biodiversity, species competition, perpetual economic growth, the importance of environmental education, and the impact of our political system on sustainability were all discussed. Not only was it difficult to identify a single definition in that discussion which adequately represented what the interviewee was communicating, but the response answered more than just the first question: it also listed common sustainability tenets, which are asked for in Question 2. Because they were already discussed, these tenets were less likely to come up again in Question 2 (what do you think are the most important tenets of environmental,

social, and fiscal stewardship?), and as a result may not have been included in the "tenets" recommendations. Difficulty in categorization existed not only across questions, but also across tenets (water was mentioned as an environmental issue and a social issue) and even within tenets (within social stewardship, the concept of actions affecting others downstream was mentioned both in the context of social justice and in the context of community). With the same concept being mentioned in several different contexts, recommending content for a curriculum that was not redundant but was thorough was a difficult task. Had this been a more structured interview with predetermined answer choices, or more emphasis on concise and direct answers, these issues may have been less likely. At the same time, questions that were more constraining or that forced only certain answers would lose the complexity that seems important to the topic of sustainability. Ideally, having interviewees participate in the editing and revising process helped to ensure proper categorization, but nonetheless, turning conversations into quantifiable and teachable points was challenging.

Quantitative measurements as a whole were limited in this study in that their primary function was to provide descriptive measures of the qualitative data gathered. For example, the quantitative measurement methods used, such as ranking, are purely based on the opinion and judgments of the intentionally selected sample of interviewees. Measurements are similarly limited in that the sample size participating in the research is small (and even smaller for those that participated in the survey), so drawing absolute conclusions or pursuing further statistical analysis to examine the data would not be appropriate. Further research might employ more quantitative analysis of this study's emerging concepts.

Lastly, a limitation frequently mentioned by respondents is that sustainability is not clean-cut; it is a concept with many different definitions, meanings, and associations. This makes it hard to quantify, and hard to provide a summary that will resonate across the campus and across the curriculum. As Fiksel et al. note, the concept of sustainability is "esoteric, multidimensional, and subject to many different interpretations. Consequently, it is a great challenge to design effective communication materials for multiple audiences inside and outside the university" (Fiksel et al., 2012). This has been evident in this research project; sustainability means different things to everyone, so it is difficult to identify which responses are most valid.

Potential for future research

"A sustainability problem for you to think about is the social sustainability of this project. Finding someone to take ownership of it and keep it going is important."-Participant

As mentioned throughout this paper, the goal for this research is to inform the content of a sustainability curriculum and provide (through that curriculum and through the research process itself) a stepping stone for further projects. Consequently, there are several avenues of potential future research that extend beyond the scope of this particular research project—particularly in design, implementation, and evaluation.

Perhaps the most immediate research to be done would be to further develop the curriculum content beyond the basic subject matter established in this research. This is true particularly for the list of sustainability tenets, which describes only concepts, often times without providing examples or going into detail. Now that there is a consensus of what is important to focus on, the next phase will entail coming up with explanatory scenarios and descriptions of these concepts to illustrate their importance in environmental, social, and fiscal arenas. This could mean creating a team of curriculum developers who are experts on each tenet area (for example, the "agriculture" tenet may require a sustainable agriculture specialist to provide more detail), and it could mean further conversation with the past interviewees. At the very least, the continuation of this project will provide further opportunity for interviewees and other interested parties to engage and shape the ideas being presented in this research. It will largely be up to this group of curriculum developers to decide the extent to which the recommendations and ratings made here will determine the curriculum content. After all, this study is not designed to determine absolute cut-off points for which concepts "should" be included, it simply provides an informed ranking of what a purposive sample of OSU sustainability stakeholders and educators think are the most important ones to include in the curriculum; the decisions about which to include and which to leave out in this introductory, voluntary, online curriculum will be left to the committee that creates the curriculum. Regardless of who takes on the task of continuing with this curriculum, however, there is immediate work to be done in elaborating on the core concepts identified.

In addition to expanding upon the content, another necessary phase of research would address the design and delivery of the material. During the interviews, many respondents questioned how the content of this curriculum would be structured and delivered (text, video, interactive slides, etc.). One method of delivery may be using video clips, as suggested by a professor who uses iTunesU as a teaching tool for his Introduction to Environmental Science course: *"Students like short clips. If there's drama, they like it. The graph to a scientist is dramatic and obvious, whereas students are visual."* Additional inquiries were made regarding the curriculum being voluntary. It is true that the voluntary nature of the curriculum may draw less participation than a required curriculum, or only draw participation among certain groups (as was seen among the participants of the sustainability knowledge assessment, where SENR had the highest response rate (Koontz et al. 2012). Delivering this curriculum in a way that facilitates participation and interest from a diversity of students on campus will be a challenge. The way this information is disseminated is clearly very important to the success of the curriculum, making this a clear path for future research.

Another potential avenue for future research would be in expanding the participant list. As discussed in the limitations section, the sample size was not representative of OSU as a whole, which may have limited the data in this study. In order to get a more holistic set of responses, the next step would be to expand the participant list and include departments outside of the selected fields of ENR, AEDECON, FABE, etc. For example, adding more respondents from other fields, such as the Arts and Humanities, was suggested by two interviewees. Perhaps this would still be

too narrow and it would be even more beneficial to expand the conversation to all disciplines. A statement made by an interviewee from the Office of Energy and Environment seems to support this latter avenue: *"We think that the issues of energy, environment, and sustainability are broad enough and large enough that we're going to need lots of people from many different backgrounds to work with one another to begin to solve the problems. So we don't want to exclude people who can potentially bring real and viable solutions."* Similarly, sustainability literature suggests that integrated or inter-disciplinary approaches to sustainability are necessary, reinforcing the idea that efforts to make further connections and bring a wider range of perspectives are desirable. In summary, OSU can always be updating and improving its sustainability knowledge portfolio, and opening the conversation to a diversity of expertise will certainly aid in that process.

Furthermore, future research could closely examine the perspectives of the "average" student or faculty member on campus. Consulting the key sustainability stakeholders was a helpful starting point for this curriculum; however, expanding the conversation beyond the "usual suspects" will give us a better idea of what the university as a whole thinks. This wider transect of knowledge will help identify the gap, if any, that exists between what sustainability experts know and what a population that better represents the university knows. As a preliminary step toward this goal, this question was informally explored in Summer 2013, when 12 students were interviewed on the Oval and asked the same questions as were asked in this research study.[5] The responses of the "everyday" student were much different from the sample of sustainability stakeholder responses, confirming suspicions that there may be varying degrees of sustainability knowledge around campus. This was done informally and solely based on observation, but did leave open the question of how different the formal answers would be between the "everyday" faculty member and hand selected sustainability experts. Further researching university-wide sustainability knowledge will help OSU identify where education can be improved, to better serve the community as a whole.

In order to gain insight on how effective this curriculum is in terms of raising sustainability literacy, it would be useful to examine a sample of the student population who took the ASK survey both before and after participating in this curriculum. Comparing their scores on the ASK survey would help to pinpoint areas in which the curriculum is effective, and indicate areas in which sustainability knowledge gaps still persist. Similarly, it would be useful (and less time constrained) to compare the overall ASK scores of students who participated in the curriculum with those who did not. While this may not be as strong of an indicator as comparing ASK scores before and after the curriculum, it could be done over one assessment survey period, so would provide more immediate feedback.

Lastly, a very important piece of further research would examine how these results could inform future projects at Ohio State beyond just the curriculum proposed by ESS. Ohio State has many

[5] This video can be found on the OEE website (oee.osu.edu)

options for integrating sustainability in the curriculum; as previously discussed, this curriculum is only one of many possible methods. Feedback from interviewees regarding the questions asked and content included may suggest that this information applies to other projects; several did not like the common sustainability concept of the three-legged stool, as mentioned in the discussion. One interviewee did not like the idea of providing definitions at all, stating that unless students can put these concepts into practice, they're just memorizing definitions—which does not contribute to the likelihood that they will graduate as global citizens. Certainly as content for this curriculum is developed, the participant list is expanded, and effectiveness is tested through ASK surveys, there will be the opportunity to discuss and move forward with additional projects that gear this content towards models that better suit the interviewees' recommendations, or OSU's goals as a university.

Benchmarking Similar Programs at Other Universities:

Whether the focus of future research lies in improving the mechanics of this particular project, or in discovering an entirely new sustainability project to move towards, one resource that should not be overlooked is the progress that other universities are making towards sustainability. Efforts to include sustainability in higher education can be seen in countless places: 467 universities have signed the Talloires Declaration[6]. Moreover, 650 institutions have registered as STARS participants, and over 600 have made the commitment to work towards climate neutrality. These are only three figures that represent the long list of university efforts to inspire sustainability in higher education worldwide. There is no question that universities are working towards an authentic commitment to sustainability, yet as an article endorsed by the University Leaders for a Sustainable Future (ULSF) states, there is little consensus as to what the sustainability end goal looks like. As such, the article recommends that academics keep "experimenting with, and sharing, their efforts to embody sustainability" (Calder & Clugston, 2003).

It may not be that any university has discovered the "silver bullet" of sustainability, or that any university ever will, but sharing experiences and feedback can be an effective way to expand awareness of best practices and reinforce emerging solutions. After reviewing the literature on sustainability in higher education, there seem to be several models at other universities that resonate with some aspect of OSU's sustainability goal to graduate environmentally literate, global citizens. Tufts University is an outstanding example of a university that has acknowledged the impact it has made on the environment, and taken active steps to mitigate the effects. These mitigation efforts are largely in the form of environmental literacy standards, which Tufts established over 20 years ago, with the core belief that the incorporation of the connection between humans and the environment into teachings across disciplines is a good way to achieve environmental literacy (Creighton, 1992). Tufts places an emphasis on producing

[6] Established in 1990, the Talloires Declaration is an official declaration made by university administrators worldwide to the commitment to define and promote sustainability in higher education

environmentally literate graduates, which is similar to Ohio State's goal of producing global citizens-- both envision a holistic view of the ecological, economic, and social aspects of our world.

Similarly, Florida Gulf Coast University (FGCU), has stated from its founding in 1997 a commitment to "ecologically literate citizenry" and requires all students to take a course entitled "The University Colloquium: A Sustainable Future." One learning outcome of this program is for students to be able to "demonstrate a practical understanding of sustainability, sense of place, and ecological literacy." This three hour requirement incorporates faculty from all of FGCU's colleges, encouraging an interdisciplinary approach to sustainability (FGCU Academic Catalog). As OSU has a focus on graduating global citizens and enhancing environmental literacy, perhaps the university could benefit from taking a closer look at the FGCU model. Additionally, the topics covered in the colloquium course (ecological, social, ethical, historical, scientific, economic, and political influences in the environment) were all touched on by the interviewees during this project, which may make the FGCU model even more relevant. While Florida Gulf Coast has had this requirement since 1997, there is no sustainability or environmental literacy assessment in place according to the AASHE STARS database, so perhaps there is a mutual opportunity for growth here, as FGCU could learn from OSU's ASK survey as well.

The University of Georgia (UGA) also has an environmental literacy requirement, which enables students to "attain knowledge of basic principles concerning environmental issues." This requirement is not one specific course, as it is at FGCU, but instead students can choose from a list of courses, as they can with any General Education Requirement.[7] OSU already has an archive of courses related to energy, environment, and sustainability; perhaps this course list, along with recommendations from sustainability leaders such as those interviewed for this research, could be consulted in developing an environmental literacy requirement for OSU. Allowing students to choose from a list of courses, rather than take one specific required course, may better respond to the interviewee's suggestion to have students apply sustainability to their own area of interest.

Arizona State University (ASU) offers sustainability certificates (voluntary) which are aligned with specific interest areas as well. One such certificate is offered for students who are interested in humanities-based approaches to the current global environmental crisis. There is also a certificate offered in energy and sustainability, for those interested in the energy realm (ASU School of Sustainability). Because this certificate program is comprised of multiple courses in one focus area, it would provide students with a less diluted overview of sustainability, however, it might not achieve the interdisciplinary approach that is increasingly seen as beneficial for sustainability education. An example of a sustainability certificate with a stronger interdisciplinary focus can be seen at University of Iowa; this certificate requires 24 hours of

[7] A list of acceptable required courses for UGA's environmental literacy requirement can be found here for reference: http://www.bulletin.uga.edu/bulletin_files/ELRFall2013.pdf

coursework from at least 8 different departments, so students get exposure to a wide range of sustainability concepts. This is a deeper commitment than the other certificates discussed, but allows more freedom for students to choose the courses that will grant them the certificate, which may increase participation (Sustainability at Iowa). Lastly, the University of Michigan has a set of sustainability modules similar to the sustainability curriculum presented here: online, voluntary, not-for-credit models which allow students to become certified "ambassadors" (Planet Blue Ambassadors).

As is outlined above, several other universities face the same challenges and goals OSU faces; many of them employ unique methods and models for sustainability in the curriculum that could be useful to OSU. If these alternative models were examined and adopted, perhaps the results from this research project would be valuable in informing and developing such models.

There are also surely avenues and implications for future research which have yet to be discovered. This project has helped develop a better sense of how sustainability is defined at Ohio State, what its concepts are, and how it should be taught. Therefore, regardless of the next direction, this research contributes to a more reliable starting point to inform further projects and initiatives.

CONCLUSION:

"Sustainability education should reach every student if the university is to contribute to an informed and effective citizenry"-Sustainability Planning at OSU

Because universities are responsible for educating the future leaders of our society, they have a fundamental and growing responsibility to prepare students for the sustainability challenges that lie ahead; sustainability is becoming a necessary subject in higher education. However, sustainability is a complex concept. It is defined in a variety of ways, largely depending on context and perspective, and is continually evolving. Indeed, part of the universal appeal of sustainability is in its various and diverse meanings and applications. As such, universities working towards integrating sustainability into the curriculum are charged with a difficult task; teachable points must be developed in order to educate environmentally literate, global citizens. Universities face the challenge of boiling sustainability down enough that it can be taught at the "101" level, while at the same time keeping in-tact its inherent universality.

In developing the content for this curriculum, Ohio State has proven it may be possible to do both. The content identified in this research provides foundational concepts which are essential to educating students on sustainability. This provides a starting point, a better idea of where to focus when integrating sustainability into the university curriculum—and when communicating a unified vision for sustainability at OSU. However, there is also now a larger conversation among OSU's sustainability leaders, emphasizing the importance of looking at the bigger picture of

sustainability, using critical thinking and problem solving skills. In just this research alone, over 20 individuals engaged in a conversation about what sustainability means to Ohio State, generating over 50 pages of feedback; this is a testament to Ohio State's commitment to sustainability on a deeper level. While this project recommends a framework of essential sustainability concepts, it is also clear that the complexity of the word and the value of the conversation at Ohio State should not be underestimated.

There are exciting opportunities ahead in terms of OSU's continued involvement in sustainability, and the curriculum discussed in this research project is one of them. While the results of this research do not provide a curriculum immediately ready for use, there is now a solid consensus-driven framework for curriculum development and implementation. Ideally, the development of this content will continue to be done in a participatory manner, in which the conversation will see new growth and evolution—inspiring not only this curriculum but future initiatives as well, several of which have been suggested in this paper. In examining the range of tenets and values that characterize sustainability at Ohio State, there is potential to enhance collaboration efforts on campus, to achieve higher environmental and sustainability literacy, and to join the global movement to institutionalize sustainability concepts into the university curriculum. This curriculum will aid the university in its growing tradition of excellence in the pursuit of sustainability, striving toward a position of eminence among peer institutions that leads not only to sustainability, but to flourishing.

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APPENDIX A:

Curriculum Recommendations

Definition:

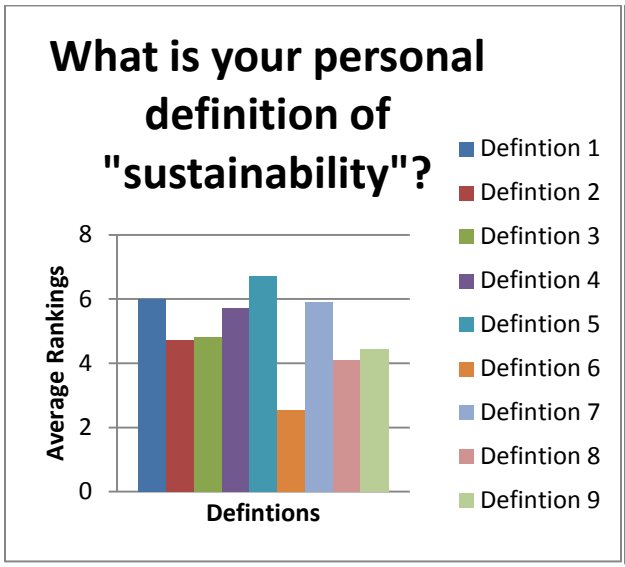


Figure 10: Definitions of Sustainability

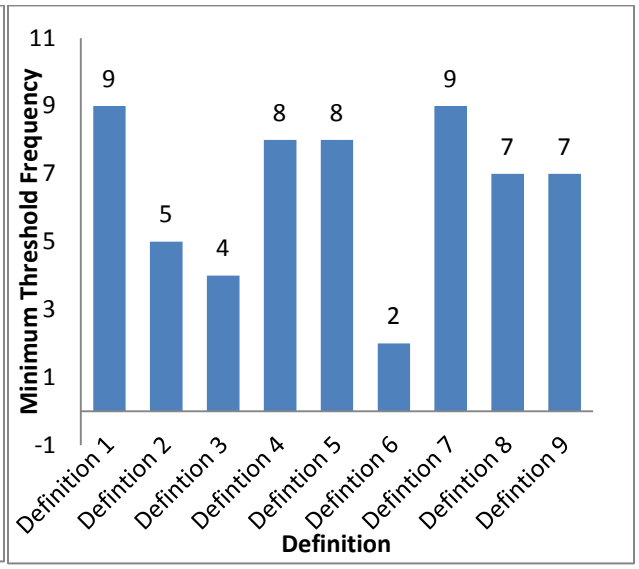


Figure 11: Minimum Threshold Frequency for Sustainability Definitions

"Sustainability is a condition that allows humans and other species to flourish and thrive in perpetuity within the carrying capacity of the earth, and in which individuals are not burdened unjustly by the actions of others. To achieve this sustainable condition, we must act in a way that perennially guards against significant risks to survival, which in part means finding a balance between the environmental, social, and economic components of a system. This balance is necessary if we are to flourish and thrive in the present without compromising the ability of future generations to do the same."

The curriculum should focus on the following tenets of environmental stewardship:

- Ecology (Ecosystem Services, Ecological Bottom Line, Cycles, etc.)
- Biodiversity (Biodiversity (Trophic Levels, Species Interactions, etc.)
- Energy (Energy (Production, Extraction, Use, Alternatives, etc.)
- Overconsumption (Consumer Culture, Buying Local, Planned Obsolescence, etc.)
- System Interconnections
- Climate Change
- Resource Management (Sustainably Managing Resources, Tragedy of Commons, etc.)
- Water (Access, Cost, Runoff, Pollution, etc.)
- Life Cycles (Where Products Come From/End Up)

The curriculum should focus on the following tenets of social stewardship:

- Justice/Equity (Environmental Justice, Social Justice, local and international examples, etc.)
- Community (Importance of Community/Building Strong Communities)
- Culture (Different Cultures Perceive Sustainability Differently)
- Consumption (How Our Consumption Affects Others)
- Power Structure/Status (Political Economy, Fundamental Cause Theory, etc.)

The curriculum should focus on the following tenets of fiscal stewardship:

- Growth (Reevaluating Growth and Progress)
- Externalities (Prices Reflecting Total Cost, Properly Valuing Resources, Price Signals, Internalizing Externalities, etc.)
- Markets (Markets and Consumer Incentives, Redistributive Mechanisms, Subsidies, Cap and Trade, Rebound and Substitution Effects)
- Value/Wealth (Redefining Wealth, Valuing Social and Environmental Factors Equally)
- Social Impacts (Capturing Social Welfare in the Market, Effect of Externalities on Social)

The curriculum should focus on the following tenets of sustainability as a whole:

- Systems Thinking (Students Need to Think of the System as a Whole, Everything is Connected)
- Critical Thinking/Bigger Picture (Critically Assessing Claims, Looking at the Bigger Picture, Paying Attention to the Impact of Your Actions, Recognizing Challenges of Sustainability-- It Is Not All Black and White)
- Societal Change

The curriculum should highlight the following sustainability initiatives at OSU:

- Educating Future Global Citizens (EEDS major, SENR courses, FLC)
- Energy (25% of OSU's Electricity Generated by Wind, Energy Efficiency Building Standards)
- Waste (Zero Waste Initiative, Composting and Recycling Programs)
- Community Involvement (Weinland Park, Community Gardens)
- President's Climate Commitment
- Research (Around 400 Faculty Researchers in Energy, Environment, or Sustainability)
- Student Support (Encouraging Student Leadership in Sustainability ex) CocaCola Grants)

The curriculum should highlight the following areas for student involvement:

- Student Organizations
- Chosen Area of Study (EEDS, Sustainability Courses, Incorporating Concepts in Any Discipline)

- Research (In Energy, Environment, or Sustainability, CocaCola Sustainability Grants)
- Lifestyle Changes (ex. Altering Consumption Patterns)
- Volunteer Opportunities (Zero Waste, BuckiServe, etc.)

Areas in which OSU could improve:

- Institutionalizing Sustainability Into the Curriculum (We should integrate sustainability into teaching university-wide, so that sustainability is a component of courses taught in all different majors. A General Education course or a multidisciplinary seminar related to sustainability would be helpful)
- Communication and Promotion of Sustainability Efforts (OSU could do a better job at promoting its many programs and initiatives and then demonstrating in a clear way their connection to a larger sustainability commitment)
- Community Involvement/Social/Environmental Justice (The concept of environmental justice and integrating sustainability into surrounding areas could be improved; we could do a better job at focusing on who is outside the borders of the university, by getting more deeply involved with community work and enhancing our social fabric)
- Embracing Sustainability Culture (Instead of just meeting the bar, we need to exceed it; OSU could be a leader in developing the next set of standards for sustainability. We have signed on verbally to the sustainability discourse, we just need to get to the point where sustainability is our culture)

APPENDIX B:

Informed Consent Form:

Thank you for participating in this project. As a reminder, the purpose of my research and of this interview is to establish a common set of sustainability principles to be used in an online, voluntary curriculum targeted at raising sustainability literacy. You are being asked to participate in this research because you have been identified as a key stakeholder in the sustainability efforts at The Ohio State University. Involvement in this study is voluntary (no payment or monetary incentive is offered) and there will be no penalty should you choose to withdraw your responses, decline to answer any question, or quit the interview at any time. These questions will be non-confidential, so if you are uncomfortable at any time with what is being asked and you do not want to be associated with your response, please tell me immediately. I urge you not to answer if you feel you would be compromising yourself or putting yourself at risk in any way. You have the option to make additional comments anonymously by putting them in the Principal Investigator's mailbox (Dr. Gregory Hitzhusen, 210 Kottman Hall, School of Environment and Natural Resources). The interview process will go as follows: First, I will ask some background information to better understand your position. Then, I would like to begin the sustainability conversation using the questions I sent you via e-mail. Your responses will be used for my research and will be included in my thesis. This interview should take between 60-90 minutes. After the interviews, I will compile the responses and follow up with you to ensure what you have told me has been understood correctly and you do not have further information to add. Afterwards, I will further refine the responses from all participants, and contact you again, requesting that you rate the responses in order of importance to you. I will then send out the results of these ratings to all participants to indicate the findings of my research. I will also send the compiled results to the Office of Energy Services and Sustainability (ESS). Once ESS receives the proposed content, your responses may be additionally used in the

collaborative process of brainstorming, creating, and refining the curriculum, which will not be a part of my research but will be informed by it.

By signing, you are confirming that you have read the above and agree with the terms of the consent form.

_____	_____	_____
Printed Name	Signature	Date

If you have any additional questions, as well as concerns or complaints about the study, please contact Dr. Gregory Hitzhusen (614-292-7739). Thank you again for your participation in this research.

Recruitment E-mail:

Good Afternoon!

My name is Clair Bullock, your name was given to me by _____ as someone I should contact. I am an undergraduate student working on my senior honors thesis, which is to develop the content for a sustainability curriculum at The Ohio State University. As you may know, a need has been identified by the university to develop a working definition of "sustainability" and to raise sustainability literacy on campus. These needs could potentially be met through a sustainability curriculum, so the goal of my research is to discover the most appropriate content for that curriculum. I will do this by interviewing key sustainability stakeholders at OSU in a participatory fashion to ensure there is investment and collaboration in the final content recommendation. You have been identified as a person who I may want to include in the process given your expertise or involvement in OSU's sustainability efforts. The interview should take between 60-90 minutes, and I will ask a series of questions about sustainability, as well as a few questions regarding your background. I have attached the questions here if you are interested in reviewing them prior to the interview, should you agree to participate. I would love to get your perspective on sustainability at OSU, so please let me know if you are interested in participating and would have time to meet with me for an interview.

Please be aware that involvement in this study is voluntary and if you choose to participate, there will be no penalty should you choose to withdraw your responses, decline to answer any question, or quit the interview at any time. This interview is for research purposes, and you will receive no direct benefits from or compensation for your involvement.

If you have any questions, please feel free to contact myself (bullock.103@osu.edu) or my advisor, Dr. Gregory Hitzhusen (hitzhusen.3@osu.edu). Thank you for your time, I hope to hear from you soon!

Best,

Clair Bullock

Interview Questions:

Background:

1. What is your position title/specialization?

2. How long have you been at the University?

3. How long have you been involved in sustainability?

Research Questions:

1. What is your personal definition of sustainability?

2. What do you think the most important tenets of environmental stewardship, social stewardship, and fiscal stewardship are?

3. What is OSU doing about each?

4. How can students get involved in each?

5. What could OSU be doing better in terms of sustainability as a whole, and in terms of each section of stewardship?

6. Do you have any recommendations for other key sustainability stakeholders that I might interview? If so, do you mind if I use your name as a reference?

APPENDIX C

SUSTAINABILITY DEFINITIONS:

Brundtland Commission Report: (6)

-The Brundtland Commission's definition, which is that sustainable development implies meeting the needs of the present without compromising the ability of future generations to meet their own needs.

-I don't mind the Brundtland Commission Report's definition. But the future generations will never have the amount of fossil fuels we have now-- there's a limited amount, so keeping that amount at the same level is a worthless goal. Trying to use what we have currently to develop the next peak in resources for future generations should be the goal.

-The ability to achieve your goals without compromising the ability of others to achieve theirs, in both the present and the future.

-The common definition implies meeting the needs of the present without compromising the capacity of future generations to meet their needs. However, this definition isn't worded in a way that gives us any insights into how to become "sustainable". What are "needs" and who gets to decide what is a "want" and what is a "need"? We can't even use resources in a way that doesn't compromise the ability of people in developing countries to meet their needs at present - how can we expect to do this for all people of future populations?

-Sustainability isn't about sacrifice and returning to the pioneer days lifestyle. It's making all this stuff that we enjoy available to future generations.

Summary: The Brundtland Commission Report's definition: sustainable development implies meeting the needs of the present without compromising the ability of future generations to meet their own needs.

Contrasting Strong vs. Weak: (2)

-We have that concept of strong versus weak sustainability, where weak sustainability is simply not depleting our resources, and strong sustainability is not only not depleting our resources, but improving our stock of resources as well.

-One valuable way to think about it is through the "weak" sustainability and "strong" sustainability perspective. To me, one of the most important questions we need to ask is how we can achieve a style and standard of living that can persist without damaging the life support systems of the planet-- and do so while being socially just. One approach is by living largely as we do, just much more efficiently. This would mean no major changes in our lifestyles, just better technology to help us reduce our environmental impacts and energy use. This is the easy, "no-sacrifice" approach and, from one perspective it appears to be the approach that has the most chance of being adopted - but maybe not the best chance of actually being sustainable. The second way is to change the structure of our society, change norms, change infrastructures, change our culture. This would be much more dramatic change and would require us using less of everything…. Changing the way we view work and money and community. This doesn't necessarily have to be a "sacrifice" because by changing some of these things we gain in some ways (health, happiness, human relationships, well-being) even if we lose in others (less convenience, less money, less material goods). The latter approach will be a much tougher sell - but very well may be the only true path to "sustainability".

Summary: Weak sustainability is simply not depleting our resources, and strong sustainability is not only not depleting our resources, but improving our stock of resources as well.

To Maintain: (6)

-It's important to convey the idea of using the resources in a good way to maintain our society.

-Simply put, sustainability is the idea that however we live can be maintained. Whatever we're doing, we can't destroy ourselves.

-Maintaining the environment and the material conditions of our work and our culture.

-I think of it as the ability to maintain the state of being of something. As a noun, it is the state of being able to continue indefinitely into the future. We're all talking about the three legs: the environmental, the economic, and the social, but the word "sustainability" really just means that something can continue indefinitely.

- The capacity to maintain economic prosperity, human well-being, and environmental integrity now and for generations to come.

-Sustainability is using the mix of resources that are available at that time to maintain the ecosystems, economy, and society at a certain level, and to maintain our standard of living. Our standard of living relies on ecological services so you have to maintain the natural environment, too, you can't just focus on humans.

-I support Merriam-Webster's definition of sustainable: 2*a* : of, relating to, or being a method of harvesting or using a resource so that the resource is not depleted or permanently damaged

Summary: Sustainability is using the mix of resources that are available at that time to maintain the ecosystems, economy, and society at certain level, and to maintain our standard of living.

Continued Existence: (4)

-Engagement with and stewardship of global systems in ways that promote continued existence of life on the planet.

-Sustainability is about identifying social, technical, economic, and political systems and structures that guide humanity in a way that will ensure our long term survival.

-To me, one of the most important questions we need to ask is how we can achieve a style and standard of living that can persist without damaging the life support systems of the planet-- and do so while being socially just.

-Be here tomorrow. So whatever we do, we have to make sure that we exist tomorrow, whether that means consuming resources at a slower rate than they're created, or financially making enough money for an organization to continue. Because ultimately, you can't do anything sustainable unless you're here.

Summary: Sustainability is about identifying social, technical, economic, and political systems and structures that guide humanity in a way that will ensure our long term survival. Whatever we do, we have to make sure that we exist tomorrow, because ultimately, you can't do anything sustainable unless you're here.

To Flourish: (1)

-[Ultimately, I think] sustainability is a condition that allows humans and other species to flourish in perpetuity within the carrying capacity of the earth and in which individuals are not burdened unjustly by the actions of others.

Summary: Sustainability is a condition that allows humans and other species to flourish and thrive in perpetuity within the carrying capacity of the earth and in which individuals are not burdened unjustly by the actions of others.

To Preserve: (2)

-I think of sustainability in terms of how we can preserve the biodiversity on earth now and still encourage the organisms that are living on it-- whether that may be humans, insects, fish, etc.

-Sustainability is a conscious recognition of mankind that the most important thing for our ability to exist is the preservation of our Earth.

Summary: I think of sustainability in terms of how we can preserve the biodiversity on earth now and still encourage the organisms that are living on it-- whether that may be humans, insects, fish, etc.

Triple Bottom Line/Variations: (7)

-I think of sustainability in the three areas: the human, natural systems, and economic components. There should be a recognition that you need those three components, and the nexus of those is where you are sustainable and can meet the needs of each system over the long term. Ultimately, that nexus is something we determine: what is the state of the natural environment that we want to maintain?

- I think people, planet, profit, is a fine starting point.

-Sustainability means economic sustainability, environmental sustainability, and cultural sustainability. All three have to be considered.

-When I think of sustainability, I also think of the 3-legged stool, or the triple bottom line, which describes sustainability in 3 dimensions: the environmental, economic, and social/ ethical/equity dimensions. We need to think about all 3 if we have any chance of whatever system we're talking about being sustainable.

-My personal definition would emphasize looking at more than just the standard resource economist's definition of non-declining overall wealth (financial, natural, and social capital) over time. We need to have a discussion of what certain thresh holds and boundaries are, and we should respect those boundaries. For instance, asking the question, "how much climate change is acceptable?"

-The capacity to maintain economic prosperity, human well-being, and environmental integrity now and for generations to come.

Alternatives to Triple Bottom Line:

-Instead of separating it into social, environmental, and fiscal [which cannot be done], I see sustainability in terms of scale, equity, and efficiency. So first, we have to ask what the absolute scale is and what it should be relative to, given the Earth's ecosystem constraints. Second, given that we have these natural and economic and physical assets, what is the equity aspect of that? Both are moral decisions that need to be made by citizens using a deliberative process. Lastly, given that we've decided how things should be shared and we've decided what the total impact should be, how can we be most efficient with the resources that we do use? So there is a scale issue, a justice or social dimension, and a resource efficiency dimension

-[In a presentation by The Natural Step] there was a slide that went beyond the triple bottom line, where traditionally sustainability is three interacting rings. They suggest that the rings are nested, where society is within the environment and economy is within society. The triple bottom line puts a business spin on things which is only a subset of what sustainability really is.

Summary: Sustainability can be separated into three areas: the environmental, social, and economic components. There should be a recognition that you need all three components, and the nexus of those is where you are sustainable and can meet the needs of each system over the long term.

Balance: (2)

-Sustainability is about balance - but a balance of a lot of forces. We are out of balance in a number of ways, and it's only now starting to become clear how many, but that's the first challenge. You have to identify *why* and *how* we are out of balance in order to determine how to get things in balance.

-A condition of a planet and civilization where everyone can flourish and thrive, and that requires that we not be depleting resources or damaging the environment or the ecosystems in order to create wealth. It may not mean even that we're growing, ideally, in a sustainable condition, populations of humans and plants and animal species are in balance with the carrying capacity of the earth.

Summary: Sustainability is about the balance of different forces. We have to identify *why* and *how* we are out of balance in order to determine how to get things in balance for sustainability.

Consciousness and Caring: (6)

-I personally think of it as an oath to do no harm.

-To me, personally, I feel like sustainability is a fortunate byproduct of a life well lived—both individually and collectively.

-Sustainability is about improving the quality of life for everybody (Debra Rowe).

-Sustainability is about caring about neighbors, the environment, future generations, all of it. I think all activities and actions that people associate with sustainability for me just boil down to caring.

-Sustainability and well-being are not two separate things, they are actually the same. If you focus on human well-being and you focus on what's important for people, then that will get you towards sustainability.

-If sustainability is anything, it's about thinking forward and thinking about building a culture over a period of time.

Summary: Sustainability is about caring about neighbors, the environment, and future generations. It is about improving the quality of life for everybody.

SUSTAINABILITY TENETS:

ENVIRONMENTAL:

-Agriculture (3)

- Pollution/Runoff
- Food/Food Access
  - Food deserts
  - Environmental impact in terms of trophic levels (ex. It makes a bigger impact to produce 1 lb of chicken than 1 lb of beef)

-Biodiversity (3)

- When it comes to biodiversity: understanding the basics of tropic levels, species interactions, how ecosystems are composed, and why it's important to maintain them as best we can, since we don't fully understand how they work. Consider the airplane rivet example. How long do you want to fly on a plane when you keep removing rivets, not knowing which one will be the one what causes the whole plane to crash? That's kind of what we're doing now [with loss of biodiversity], and we don't know which rivet will be the last piece.

-Climate Change (4)

- The twin issues of climate change and biodiversity loss, which are related. If climate change isn't tangentially related to what is being discussed in terms of sustainability or biodiversity loss, then we aren't going to get anywhere.
- Climate change and its global effects (loss of habitats, more severe weather patterns, loss of biodiversity, rising sea levels, etc.)

-Ecology (7)

- The health of our ecosystems is everything.
- A huge problem is we legislate when things are dying, not in order to just keep things flourishing. We need to pay attention to the flourishing and let that flourishing be our goal.
- Environmental sustainability is about not harming the ecological processes and allowing ecological functions to continue as they are. To the degree that we are interfering with that, we're reducing the ability of the environment to continue indefinitely into the future.
- Ecosystem services and how everything has to be in balance. All the components of our ecosystem have roles; everything is in the ecosystem for a reason. It's a chain, take one link out of a chain and the chain no longer operates.
- There is an ecological bottom line, and it is critical. Traditionally it has been thought that it would all work itself out. But no, there *is* an ecological bottom line, and we need to take it seriously.
- We need to understand that as humans and as a society and economy we exist within the larger biosphere and earth ecosystem which imposes certain constraints and limits on what we can do. The ecosystem imposes constraints, and the natural implication is that we need to work hard to understand what those constraints are.
- I think understanding the basics of ecosystem functioning (which is a very broad term) is also important. We need to understand the components of ecosystems that we rely on for most of our lifestyle.
- Understanding how the natural world works. If we don't know how it works then we can't adjust our lifestyles or socioeconomic systems accordingly. Water cycles, impacts of climate change on precipitation, glacial retreat, changes in monsoon patterns, etc. – we need to understand our natural system in order to adapt for the changes coming in those systems, and to mitigate what is already happening.
- Understanding how you measure the natural stock of environmental capital.
- Measurement and flows-- replenishment and replacement from a systems standpoint.
- When it comes to curriculum, students need to know basic environmental science, basic ecology and basic evolutionary theory.
- All of the other organisms have biodiversity and competition and each one balances the other out

so no one species in the system will overtake the other. Whereas humans tend to take over whatever we want. So, protecting sustainability comes down to humans understanding that we can't do whatever we want. We need to value other organisms to be as important, if not more important than, humans.

-Energy (5)

- Use
  - (The biggest driver of climate change is energy use)
  - We need people to spread out their energy use. The peak stuff is the dirtiest and worst stuff you can use. If the peak can be smoothed out and pushed out into other times of the day, we can spread out the energy demand and have the best and cleanest facilities happening all the time. The big deal with alternative energy sources is they're not reliable enough, so we just stick to coal. So we need to focus on storage devices and spreading out the load. Energy infrastructure will drive environmental sustainability.
- Impacts of personal energy use (leaving charger plugged in)
- Production **(**Hydroelectric and coal power generation)
- Extraction
- Externalities
- Alternatives

-Environmental Sensitivity (1)

- Another tenet is to connect people with the natural world and orient them towards the natural world so they have a basic sensitivity to it. Without that environmental sensitivity we do not have the behaviors and attitudes that are necessary for change. When people are so disconnected and they don't have sensitivity to the natural world, we're in trouble.

-Land use change (1)

- The most significant driver in the loss of species and ecosystems around the world is conversion of natural spaces into human developments (farmlands, cities, etc.),

-Life Cycles (4)

- Considering life cycles is important. In many communities, lots of money and energy has been spent getting plastic bags outlawed. This helps the litter and wildlife problems, yes, but if you consider the life cycle of paper [compared to plastic]-- it isn't that great either, with the harvesting of trees and processing of pulp, etc. It's not worth the energy that you spend worrying about it. There are costs that don't always offset the benefits. It is important to understand what is material or significant. [So] the effort instead needs to be in [the life cycle:] what we buy, how we buy it, and how it's packaged so we generate less in the first place.
- All the industrial background processes that we don't pay attention to [so extracting the minerals and getting the power to do that, and then making them into something] have a profound impact on local environmental conditions (in developing countries mostly-- we don't want to dig up 800 acres of land here to get minerals for a cell phone).
- I think the most important thing to consider is being conscientious about where resources come from. For example, the long and complicated process of turning coal into safe and reliable electricity. There is time and cost and expense associated with each step in that route. From the time the coal is burned to the time the light is emitted, we only have around thirty percent efficiency through the entire process. So the less light you consume, the greater the efficiencies you get back all the way up stream to the source. Being conscious about those use decisions sends

home the point of sustainability.

- The fact that consumption behavior influences the social sustainability of other communities is really important to consider. So, that means knowing where products come from. It doesn't just appear on the shelf, it's made somewhere; how does it get there? We should understand the life cycle of food, materials, everything.

-Overconsumption (3)

- We have too much, and we still think we need to grow. Look at the business world; if you're not growing you're not a successful business. We need to maintain where we are and learn to live with a little less
- Consumer culture/Planned Obsolescence (the reason things fall apart in a set amount of time because it's explicitly designed that way. Products are designed so that they become obsolete, so people have to buy more).
- Consuming Local
- Students should understand why and how and the rate at which we consume-- and how to deal with it.
- If you want to address overconsumption, you have to address work hours and pay.. if you give people money, they will spend it, and things will expand. So we need to rethink how we value time, and try to operate at a slower pace where possible.. we spend too much time in the pursuit of income and wealth.

-Resiliency (3)

- Resilience has to do with the system being able to respond to perturbations and being able to return to its original state of being.
- The more resilient a system is, the less efficient it is, and people always want efficiency. Ecosystems need to be redundant and resilient, though; if there is one bird that can pollinate the fig tree, which is a keystone species, then there's a cascading effect when that one bird dies. A resilient ecosystem has to do with functional overlap. The fig tree needs two pollinators, so an overlap of functions is needed among species-- which is inherently inefficient because that means two people are doing the same thing. Efficiency in the business world has to do with pulling apart overlap so you don't have any wasted effort and therefore wasted cost. So the more efficient you get by having no overlap and no two people doing the same job, the less resilient you get-- since if there's a shock to the system and people quit, then you have more turmoil. Resilience and sustainability are very closely linked. So I think efficiency might hurt the sustainability cause in a way.
- You need some redundancy in systems up to a point. You just can't be so efficient that everything has to go perfectly all the time because it doesn't.
- Building resilience to turbulent change and uncertainty

-Resource Management (2)

- Sustainable management of a resource does not mean setting aside the resource and making it off limits for public use. It means not harvesting more than what can be reproduced in new growth.
- Tragedy of the Commons
- Knowing how to work with natural systems and processes in a regenerative fashion as opposed to a depleting fashion.
- We should look at the system itself and how it works instead of imposing things from the outside-- we can work with the natural processes rather than trying to figure out how to externally impose resources on those processes to fix them.

-Scale (1)

- It's important to understand how different environmental processes act at different local, regional, and global scales and how they interact with each other. For example, the processes of carbon cycling and nutrient cycling and climate change-- they're important global issues. [And] water quality for example, that's more of a localized scale issue.

-Spatial/Temporal Effects (3)

- Depending on where you live, your footprint will be very different.
- The science of time-- if you don't have a certain perspective on geologic time, it's very hard to deal with atmospheric questions like climate change or questions about evolution or extinction or biodiversity. If we're fooled by short term analysis, one of the features that could get us in trouble is the notion of a tipping point. Yes, things could level out, but if we are already close to a tipping point then we're still in trouble.
- Temporal difference between actions and impacts

-System Interconnections (4)

- Recognizing that decisions that students make have impacts in places they wouldn't imagine. Ultimately, the decisions people make about the phone they purchase can have impacts on social sustainability in communities in China.
- Ecosystem services and how everything has to be in balance. All the components of our ecosystem have roles; everything is in the ecosystem for a reason. It's a chain, take one link out of a chain and the chain no longer operates.
- We need critical thinkers that understand that one aspect of sustainability affects the others all the time.
- Cause and effect

-Transportation (1)

- Students should know about environmental impacts of transportation, whether it's by car, biking, or sharing more pedestrian friendly designs of our cities and neighborhoods.

-Uncertainty of systems (5)

- We don't really know all the answers.
- Chaos or complexity—understanding that these aren't mechanistic systems, rather they are stochastic and accidents happen.
- Tipping Point- We think that things are moving along gradually and that's reassuring to us, but science shows us that we can feel like things are gradual and then we can reach a tipping point and suddenly everything is destroyed.
- There are thresh holds we have to pay attention to, and there's a total scale of our impact that we have to be within so we don't have things that are irreversibly lost.
- Systems Coupling
    - Interactions/Cascading Effects- Changes in one component affect changes in another, resulting in unexpected and unanticipated outcomes. So if you change something internal to the natural system, it will also affect the other two systems. "If you pull this thread, it will have unintended outcomes somewhere else." That outcome could be good or it could be bad, but at least we should know that they exist.
    - I'd focus on systems and feedback. How do the various physical and biological systems interact with one another in the big picture? I'd want students to come away with the higher-level concepts of systems and feedback and problems and issues like chaos or complexity.

-*Waste (4)*

- Waste Stream (Where our stuff comes from and where it goes).
- E-waste disposal (Equipment generally goes into a container ship and it's dumped on the shore of China or India or Africa, or people burn stuff off of it for the metals, and are then exposed to horrible toxins as a result)
- Nuclear waste disposal
- Importance of reusing, recycling, composting

-*Water (4)*

- Freshwater use, replenishment rate
- Access
- True cost of water
- Availability worldwide
- Condition of our water resources
- Protection of our water resources
- Nutrients in our water
- Surface water runoff and pollution of surface water
- Wetland services

SOCIAL:

-"Stewardship" is a problematic term and I wouldn't use it.

-The word stewardship has a connotation of management and conscious direction. I think it is hard to manage social systems, and it may not be wise.

-For me, sustainability is a social and cultural issue. So [other] questions follow from how we understand it beginning as a social issue.

-*Community (3)*

- Actions affect others downstream
- Reconnecting with our human nature to be a part of a community. I think that humans are so far removed from what it means to actually be a human that we don't even know what the word means anymore. But if we were doing things that were best for our community all the time-- that would inherently be something that would support the Earth.
- The idea of community (within OSU, around OSU, and the term in general—what it is, and why it's worth valuing) is important.

-*Consumption (1)*

- The fact that consumption behavior influences the social sustainability of other communities is really important to consider. So, that means knowing where products come from. It doesn't just appear on the shelf, it's made somewhere; how does it get there?

-*Culture (2)*

- We're not going to get very far in cultural sustainability if we can't listen to how people perceive their environment and our shared environment. So a key issue is the ability to see science as a product of culture and to understand that there are other ways of viewing the world.
- Students should be exposed to the ways that different cultures view humanity's place in the world

-Development (1)

- What developing and developed means. There's the idea of leapfrogging that developing nations will leapfrog over developed nations instead of replicating what they're doing now.

-Justice/Equity (14)

- Justice and equal opportunities promote a society that continues into the future.
- The social side pertains more to justice and equity than stewardship.
- When we talk about the social dimensions of sustainability, we have to take into account equity and justice.
- I think the way we live should be just and fair. We somehow have to figure out how to take things that are out of sight and out of mind and make them real. We live off in our own country and ship our pollution elsewhere and don't have to know what's going on, we just keep on chugging. We are burdening people who don't deserve it at all and don't have the power to stop us, and that is a sign we are not being truly sustainable.

Equity:

- Equity, which is really about making sure there are equal opportunities for all members of a society to thrive. That might have to do with the structural characteristics of a society that disadvantage certain groups of people through no fault of their own. For example, if the wealth is very concentrated in one area, there won't be equal opportunities for all. Understanding how society is structured and understanding how that affects the opportunities of different members is important for social sustainability. We need to understand whose voices are translated into laws and policies, and who is ultimately listened to.
- Equity, meaning we have to get rid of externalities. Businesses depend on profit to externalize their costs (internalizing the cost of dealing with the environmental consequences and health issues is just not profitable). We need to get rid of externalities so that prices reflect costs.
- With a lot of environmental problems we have to ask ourselves, "how are the resources [and benefits] distributed, and are they distributed equitably?" I'm not saying equally, but equitably. So then you have to ask the question "what is just?" That has to be a consideration too.
- Wealth Distribution
- [The idea of] winners and losers and unequal exposure to problems and unequal benefits from infrastructure/drawing on natural resources.
- Assuring equity in access to opportunities for personal fulfillment

Justice:

- Justice, and doing the right thing because it's the right thing to do.
- The World Business Council for Sustainable Development has a tagline: "businesses can't survive in a world where societies are broken or dysfunctional." We need prosperous people to buy the products and services.
    - If you have rampant social and cultural injustice, you're unlikely to be able to sustain business practices and infrastructure; such things have a way of not faring very well in unrest and revolt.
    - Injustices are just a sign of inadequate sensitivity to the well-being of others, human and non-human.

Social justice:

- Students should know about social justice, and understand it on an international scale. We are too insulated here from recognizing the impact our lifestyles have on people around the world. It is important for students to recognize that what appear to be simple choices to us (i.e. protect biodiversity, do what you can to reduce carbon emissions) are choices that involve very critical tradeoffs in other parts of the world (i.e. protect biodiversity at the expense of my ability to grow

food for my family).
- Workers around the world face a variety of social injustices, including low wages, poor working conditions, and lack of access to education

Environmental Justice:

- Any attempt for people to look at the environment and look at the conditions in which people live and try to make it more humane is about environmental justice
- Environmental justice at a global level as well as at a national level and the history that goes into that, such as institutional racism (the idea that institutions are developed in a racist technocratic way and that perpetuates inequalities).

-Ex) it's a justice issue that not everyone has access to water. It's a social justice issue that because of the way we do construction, when it rains hard, there is more runoff in urban areas going straight to rivers so you get more flooding down the river. Also the quality of water going in, it may be okay here but if we keep adding agricultural pollution, it affects the water [in communities] downstream).

-Ex) if we are getting energy from coal, what happens in communities where you burn the coal? What are the implications of mining where you get the coal like in West Virginia with mountaintop removal?

-Ex) Ewaste disposal: Equipment generally goes into a container ship and it's dumped on the shore of China or India or Africa, or people burn stuff off of it for the metals, and are then exposed to horrible toxins as a result.

-Ex) Food is a huge social justice issue. Not everyone has access to good food; in urban areas you have food deserts so if you're lower income you don't have as much access to good nutritious food as you would if you were a more affluent person with better resources.

-Connecting uncertainty to people's livelihoods and well-being. Natural resources are used and their extraction is necessary for the livelihood and quality of life of some people, but in some cases it also takes away from quality of life. You have to wonder what sustainability is from the human side; do the communities have the opportunity to have a voice in the process?

-Climate Change- there are a lot of examples of how climate change creates unrest and often leads to conflict in social systems.

-It's also important to know about shifting costs. So, going back to the Pacific Northwest example; we stop harvesting wood in US, but we still need to harvest because the demand hasn't changed, so we go somewhere else.. and often we go somewhere where the harvest is cheaper with fewer environmental regulations and fewer human labor regulations. So now we end up with situations where endangered forests are being destroyed for our lawn furniture, and there are unsafe conditions with low paid workers and we contributed to that. There are massive implications for social systems there because they were engaged in an indigenous lifestyle that is being decimated, or their lifestyle is being sold off to a higher bidder. The idea of exporting our environmental cost is an important thing to think about.

-Part of the social aspect of sustainability is being able to achieve your goals without compromising others' ability to achieve their goals. For example, we know we have a finite supply of coal and oil and natural gas, however we need their products (like petroleum) for transportation, energy, production, etc. By using petroleum for these things, we're impinging upon someone else's ability to use it for more urgent things in the future (like medicine to save lives). So to me, one example of being socially sustainable would be to determine that petroleum is too valuable to use for transportation.

-Measuring Social Benefits (1)

- A lot of the social things with sustainability we don't have good metrics on, [but we] can't discount social value just because we don't have the metrics for it. People need to be educated that the benefit of a lot of our actions is not necessarily tangible-- it is emotional and psychological well-being. For instance farmers markets; if you looked at them based on economics and resource use, they might not make sense-- things are grown on a small scale and driven from Delaware to Clintonville, so there are transportation costs and also production costs (farmers have to buy fertilizer at retail rates because they buy in small quantities). So the big value there is the sense of community (which is a social good and it's hard to measure). People are paying higher rates, so farmers markets might not make sense in any other way. But people are willing to pay more because they are buying a sense of community. Sure, there may be variety of choice or a little better quality, but ultimately, they pay for the sense of community. And you know people feel that social benefit-- that's why they're so popular. When you do stuff at a small scale, the economics go out the window, but the social benefits skyrocket.

-Power Structure/Status (4)

- The idea that some people who assert their values come from areas with political power, votes, and money, but don't have to face the consequences of the decisions that are made. We have to weigh the costs of preservation. There are serious negative costs-- which are potentially okay, but if you're making a legitimate decision, then you should take them into account and find that they're worth it.
- We need to be attentive to the political economy questions, and understand why certain people are benefiting and why others aren't. Why are some solutions on the table and some aren't? Some level of economic goals need to be maintained, and these decisions are a function of who is in power. Every interest needs to be represented effectively and solutions need to be articulated in a way that they represent the diverse needs of the population.
- Fundamental cause theory, which states that those who are the most socially vulnerable are always in the worst places, meaning there's a fundamental cause for the health inequalities among those vulnerable people.
- For me, it’s about reorienting the characteristics we associate with status. Right now and throughout history, status is associated with wealth and consumption. But if we can reorient the way we think about status and prestige, that might help change our social system in a way that has a lower environmental impact through lowering consumption.

-Problematizing (1)

- From a social system, we have to see that sometimes things aren't problematized properly. Some problems don't have to do with the environment, they have to do with the economic structure. If the problem is that people don't have jobs, then what they need is a job, not a community garden. Sometimes, environmental solutions are band-aid solutions to bigger social problems.

-Temporal (2)

- Separation results in time is a pretty big thing. We expect immediate or short term results but we may not know the outcomes for the long term. For example, in some places in Pennsylvania, the oil and gas companies will come in and say they'll maintain the roads for x period of time, which they do, but they don't account for afterwards. So in the short term it sounds good because communities don't have the tax base to maintain the roads as well as they would like, but then when the companies leave the community, things aren't in good shape. There is a temporal difference between actions and impacts.
- Time discounting, and how and when people’s time discount rates vary and change over time.

FISCAL:

-This wouldn't be the word I'd use, I'd use economic.

-The term “fiscal” seems narrow, I would think more along the lines of economics.

-I’d use either “economic” or “business”

-Sustainability will never work if there is no economic sense. Environmentalists have to realize that you have to take economics seriously.

-Externalities (6)

- It is important that the enterprises producing and people buying are taking care of externalities. A lot of environmental problems can be boiled down to the fact that externalities aren't being paid for and people and countries do things that pass off the cost to other people who aren't part of the bargain, and aren't getting anything from it in return. Take pollution, for example-- producers don't have to pay the cost, or put it in the product and make the product more expensive. Instead, it affects people who aren't even involved. If you can get the externalities paid for by the people in the transaction, a lot of stuff would take care of itself. If things cost more, people would consume less.
- We struggle in that we have created systems that don't make it easy to recognize the full impact of our decisions. If food was priced according to the impact it had, it would be priced very differently. When it comes to greenhouse gases, everyone thinks of vehicles as a primary cause-- which is good. But they don't think about power or other travel (like planes), and those carbon footprints are big.
- I think having an understanding of the full cost and externalities is the most important thing economics can teach us. We need to be living off of interest rather than drawing down capital, and making profit to sustain the future in order to generate net benefit over and above the capital. We should focus on long term profit.
- We have to get rid of externalities. Businesses depend on profit to externalize their costs (internalizing the cost of dealing with the environmental consequences and health issues is just not profitable). We need to get rid of externalities so that prices reflect costs.
- Prices have to reflect costs of all activities, products, and services. Energy, food, transportation, buildings, water, electronics (computers), etc. all do not currently reflect true costs.
- If we had to pay for all the costs associated with the goods we use every day, then the cost of the raw materials to make the product, the cost of the environmental damage caused by the production, and the cost of health care for employees who manufacture the product would all go into calculating the true costs of the product.
- We just need to pay the cost. It should be part of the education that we are mortgaging the future. And that's not a guilt trip, it's a fact. It's irresponsible.
- Resources are valued properly when the cost of something reflects the embedded costs associated with its production, plus profit. Costs are so externalized that you're not paying the full cost of what you're getting. We can't properly value a resource if we aren't internalizing the externalities.
- Asking, “what are the resources that went into the process, what are the hidden costs, and how do we bring them into play?” will help us understand the true cost of an item.
- Carbon emissions and cap and trade are market mechanisms by which we can create exchanges and achieve goals by bringing cost into play and creating incentives for people to act differently.
- We need economic figuring—the ecological bottom line has to matter economically, which will never work by valuing everything according to the dollar value. Aesthetic must weigh in as well so we can eliminate the externalities. Things need to cost what they really cost.
- There is too much externality. We’re not valuing natural resources except for when they have monetary value.
- Price signals- An example is gasoline- $4 a gallon is cheaper than the full cost of that gallon. We

are so dependent because the price signal doesn't make us do anything; we make choices based on artificial price. The real price is reflected in the production and use of gasoline as it causes damages to the environment and people that aren't in the exchange.

- We have to figure out a lot more actively where the line is that we can't cross because we are encouraging greed and injustice. We need to be able to say this is not just and it is unfair and it is unmerciful. That should be able to count, because people aren't always going to buy your numbers and your calculations.
- Some of the cost of the food in a grocery store is being deferred onto the below living standard wages that the migrants who pick the food earn, onto the diesel that drives the food here, and the quality of life of the animals the food derived from. All that stuff is subsidizing our food and making it cheaper. We don't think it's cheap, but it is.
- The importance of fiscal sustainability is understanding that there are no absolutes and everything has a total cost. So not just considering operating costs or physical costs, but also the costs on society, the planet, and on your life span.

-Growth (3)

- Using what we have.. Growth is not always good-- More is not always better-- in fact, in most cases, more is *not* better. The idea that you have to be growing and making more money and increasing profits is not sustainable; you can't increase indefinitely. There has to be a goal, and when we reach that goal, we are satisfied.
- I think that there is often too much emphasis on [being] the biggest and the best in America. That's where growth imperative comes from.. everything has to be growing and expanding and everything needs to get bigger to hold our place. It seems like we live in a world where nothing is ever "enough." That kind of thinking is dangerous.
- I think we need to start reconsidering the way we measure progress; sustainable development is not necessarily about economic growth
- The challenge for businesses is how to reconcile the affect that the pursuit of pure economic growth has. How do you train business-people to accept the concept of limits and of "enough" or "sufficiency"? In business, if you don't grow, you die - and that's a problem because it makes growth an imperative and there are physical limits on the planet that preclude us from pursuing unceasing growth.
- The discussion in America (not only in America, but primarily) has been narrowed in a way that has made [the term sustainability] very compatible with straightforward, capitalistic, economic, growth-oriented policies. So the attitude has become that sustainability without economic growth is impossible.
- Using resources, like fossil fuels, can create economic growth. However, future generations may be disadvantaged if the current generation overuses these resources. If we do not want to disadvantage the next generation, renewable resources such as fish, soil, and groundwater must be used no faster than the rate at which they regenerate.

-Historical Perspective (1)

- The history of corporations being seen as people to the government.
- It would be helpful to state how we've done capitalism in the past, and then look into whether or not we can do capitalism right.

-Markets (3)

- I want people to understand the mechanics of markets and investment, both public and private, but I want those to be taught in a context that always sees them as part of a system that includes fiscal, environmental, and social elements.

- Markets and incentives, and individual consumer incentives and how we weigh long and short term management of both personal and public finances
- Markets distribute; they're efficient. But they have to be subject to constraints such as scale and equity, and be able to function within them. For instance, if income goes above a certain level, you get taxed. That is a redistributive mechanism that speaks to the equity issue, and markets function within those constraints. We're good at efficiency and allocations, and not so good about constraints. If we aren't conscious, the result will be that incentives will be wrong and businesses will over consume and over pollute, as will individuals.
- In terms of sustainability and business, I would just say don't stop at efficiency. Don't stop at how to design businesses to use less water and energy. Because while efficiency is good to a degree, it's not everything, and I think it leads to a lot of rebound effects and substitution effects (rebound effects are when you buy something that is more energy efficient, but then use it more so you don't end up saving much energy. Ex) you buy a prius but then drive it more because it's cheaper to operate and uses less fuel per mile… Substitution effects are when you use the money you save on gas by driving a prius to make a purchase that offset the benefit of the prius (i.e. fly around the world for a vacation). Because of these effects, we aren't going to be sustainable from efficiency alone.

-Profitability (1)

- Economic sustainability is most commonly defined as long term profitability. It is not enough to simply have cost=revenue or to be continually expanding; what is considered most sustainable is being profitable in the long term.

-Social Impacts (2)

- A lot of times the way I think of economics is how it impacts the social system ex) what is the living wage of the people that are being forced to put our products together? It's cheaper to import wood from Brazil because of the lack of environmental regulation compared to here, so you have to know workers weren't being treated well, weren't being paid enough, and the environmental protection wasn't great.
- Also the idea of capturing social welfare in the market. This means shifting the marginal benefit curve from individuals and private organizations up to where the social benefit curve is, so that you get all environmental, social, and fiscal benefits.

-Stability (1)

- Fiscal sustainability consists of fiscal arrangements that are relatively impervious to market and funding fluctuations or other corners of the market

-Value/Wealth (2)

- Refocus what it really means to be economical and wealthy. We need to redefine our definitions of value and wealth.
- It is important to know that things can be material and valuable on the creativity and innovation side, and not necessarily make fiscal sense. For example, at the Waste Not Center, businesses and individuals could donate things that they would [normally] throw out. The fiscal analysis showed it costing [the Center] $1000 to divert a ton of waste from the landfill, whereas it costs $40 to dump a ton of waste in the landfill. [So there was no fiscal value in saving waste from the landfill.] The real value there was the Center was getting supplies to teachers that they couldn't buy, and kids were able to create things out of them. Fostering innovation; that was the real value. This art could have sparked in a student the creativity to change the world, making it extremely valuable [even without making fiscal sense].

SUSTAINABILITY AS A WHOLE:

-Critical Thinking/Bigger Picture (9)

- There are so many myths surrounding energy efficiency and sustainability, so critical thinking is key. Students need to analyze – don't jump on or off the bandwagon. Be a skeptic.
- Not acting is acting, so students need to [learn to] ask tough questions about how to arrive at decisions when we know that we don't know science fully. So asking questions like how do I decide who to trust, what to read, issues like that.
- Another key thing is looking at the bigger picture. [For example,] a lot of people think green biofuels are awesome, but a lot of them take more energy to make than it takes to get oil, so it's actually a loss to the environment-- corn ethanol is an example.
- In all of these dimensions, I find myself recommending paying attention. It is important to stop and figure out what the heck is going on, and what the impacts of your actions are. Pay attention. We forget we are inside something larger than us that was a gift to us.
- Students should know what matters in the overall scheme of things. Students need to understand what the options are, and what the costs of those different options are, and learn how to pick the ones that have the best economic, social, and fiscal benefit.
- Students need to know it's not all black and white-- variations and disagreements about sustainability are everywhere, even within disciplines.
- In terms of this curriculum, people need to get beyond the superficial baseline belief of what sustainability really is. Students should recognize that it's much bigger than a superficial definition. An example of that would be in ENR 2300, looking at the case study of the spotted owl controversy. Most people come into the class with a belief that logging is bad and should be stopped, but that's pretty superficial. The demand for wood isn't going to go away necessarily unless we make other big changes. So, that's just moving the demand for wood elsewhere, and it's resulting in social destruction, meaning stopping logging isn't necessarily that sustainable. Recognizing all the challenges is important and we often don't. People need to think more critically about what sustainability means and what backs it up, especially in terms of geographic and systemic connections.
- We should focus on what the term sustainability actually means, not focus on turning people into sustainable people. It's more valuable to understand what exactly sustainability entails. This should be a class that talks about the topic and the perspectives and the details of sustainability to prepare students for the fact that it will come up again and again in their future.
- Students should be exposed to ideas of how to critically assess claims about these things and the information coming in. The sustainability issue can easily become a value-laden topic, so the university's role should be based on critical thinking and evaluation. We don't want to brainwash students into doing good actions. We want them to come away with critical thinking, that may lead them to good actions, but the important part is the thinking that got them there. If people are critically thinking, not just swallowing a line of reasoning without being critical, we can be happy about that. These claims evaluations aren't really taught at OSU, but they have to be part of the education process.
- There are lots of things to be said about all of those, but I would say that the common denominator is stewardship. And what does that mean? So who are we responsible for and accountable to and what is the time frame in which we are conducting stewardship? Until you've answered those questions, all you're memorizing is definitions, you're not tackling the problems.

-Education (3)

- I think that education is the #1 thing, not just in terms of sustainability but in general-- people need to be educated. If you educate people about what they're doing, I think they'll change.
- From a sustainable development perspective, I think education—in general—is critical. Particularly women's education. There are opportunities to solve a lot of political, economic, and social problems when you educate women.
- It is important to educate students and citizens who will be good stewards and keep this conversation going.
- There needs to be life-long learning about sustainability issues.

-Limits (2)

- I think within all the systems [environmental, social, and fiscal], it's important to get the idea that there are limits to those systems. For example, wealth is not inexhaustible and it can't always be created-- and it's the same thing with social systems and natural systems. None are inexhaustible; there are limits to growth and success.
- I think it's important to get students exposed the idea of the bio-physical limits and the long-term outcomes of a socio-economic system that pursues (and requires) growth. There certainly isn't full consensus on this (there are still economists who argue that there are no limits or that they can be avoided) - but this debate is one that students should be familiar with

-Preventative culture (3)

- As we become aware that there's so much to do, we have to let things go. So that the things we put our time and energy and money into make a difference. A lot of people make a big deal about turning water off when they brush their teeth. The habit and awareness part is good, but the amount of water saved is a drop in the bucket, literally. Similarly, endangered species cost so much more to get off the list than just to prevent them from getting on it in the first place. But we don't have a preventative culture.
- At least it's good that we pay attention when the environment is so bad that we're facing ecological disaster, but it would be good to pay attention to beauty and flourishing and abundance of the natural world rather than treating the world in a way that we take care of it just so we can survive.
- The application of the precautionary principle is important [which basically says] instead of assuming things are fine for sustainability, being more cautious and testing things and being open to making changes instead of realizing after a catastrophe "oh, that was what we needed to change"
- It would be nice if we could have a transition strategy from how we are now to how we will be 75 years from now instead of just having destruction and throwing up our hands. For that, we have to change the political and business institutions. We have so many incentives and practices in place that encourage local and independent decisions (for instance, I drove here this morning alone) that could be translated into sustainable decisions. The whole community is laid out for the automobile; our power system is fueled by fossil fuels. As a solution, some people just want to cut everyone off over night, but that isn't practical-- we need a good transition plan. Humans seem to only react to crisis, but we *have* to get there.

-Societal Change (1)

- I just think you have to start making sustainability important at a young age. We have to start with preschoolers and kindergarteners, and then maybe in 20 years we will have a different mentality. Our politicians aren't going to encourage these changes; no one will get reelected if we say "it's time to live with less. Make sacrifices. Consume less. Use lights less. Drive less." That won't be pushed for, so we need a change in society and a change in thinking.

-Systems Thinking (5)

- Students need to think of the system as a whole.
- We should think of sustainability from a systems approach.
- The biggest thing students should be aware of is systems thinking, which means that everything is connected to everything else so changing anything has consequences farther than what you may have predicted
- I think you should have those three components, and then an "integrated sections" part where you

look at things like how the economy relies on the ecosystems, how society relies on the economy and ecosystems, and how they all impact each other. There should be some place at the end or beginning to show how they're all united.

- Understanding the interdependence of these different spheres.

-Tradeoffs (2)

- Everything cannot be equally traded off.
- Everything has a tradeoff and we must be aware of that. Having the foresight to think about what the tradeoffs might be with proposed technology and policy etc.. most things involve important tradeoffs for someone.

WHAT IS OSU DOING ABOUT EACH?

ENVIRONMENTAL:

Ecosystem Services:

- We got rid of the dam and are letting the Olentangy go back to its native state, which is a good example of how we are committed to sustainability and environmental issues and are doing things about both. Some people see the dam removal on the river as a disaster, but in a few years it will look much better, so I think that's a good learning thing; like, this is what it takes to get a natural system back to some version of the way it was after so much human activity.
- Olentangy river restoration and dam removal
- Wilma H. Schiermeier Olentangy River Wetland Research Park has been given the Ramsar designation of international importance (it is the only Ramsar site out of a university in the US)
- Working to restore the ecology of campus back to a more natural state—the land before we were here.

Educating future global citizens:

- The university is encouraging growth in education as far as courses targeted towards environmental issues.
- On the academic side, we are probably still at the infancy level of inserting sustainability into the curriculum. However, there are some sustainability courses in various departments and there's a faculty committee that will formally look at whether or not there should be a requirement in the curriculum-- and if so, what that would look like for each student.
- The university was lacking on the academic side but I think EEDS and the individual sustainability courses and SENR sustainability efforts are filling that gap.
- Faculty and Professional Learning Community on Sustainability Across the Curriculum
- We do education through residence halls
- Contests between dorms (Blackburn and Norton) to see who was more "environmental" in terms of energy, water, etc.
- ENR Scholars' "No Impact Week"
- We work to bring in speakers, like Steve Kellert or KrochetKids.
- There is a small course called the FYE sustainability series for first year students and the university is developing one for 2nd year students through the STEP program
- Educationally and curricularly, there are lots and lots of one-offs. And dozens of classes where students will learn some part of something that could be called sustainability
- The curricular efforts through SENR
- there are lots of environmental sciences programs and there are a number of environmental studies programs
- EEDS major (6)
- SENR's Carbon Sequestration Center
- ENR 2367 course, which focuses on sustainability projects and uses the Campus as a Living Laboratory

approach, so the projects actually get implemented in some cases
- SENR's Australia study abroad, which deals with social, environmental, and economic sustainability
- Sustainability and Business classes
- Sustainability knowledge assessments

Energy:

- 25% of our electricity is generated by wind
    - as far as we know, at the time it was the largest ever actual purchase of wind energy by a university or a non-utility in the US.
- We currently have 50 megawatts worth of wind which was a 15 % reduction in our emissions profile.
- Effective management of energy and the reduction of energy use
- There is a campus wide-energy efficiency improvement of all buildings that need it (also stated under infrastructure)
- We are constantly examining opportunities for renewable energy.
- We built the geothermal field which will offset some heating and cooling costs.
- We have a lot going on
- We're making decisions about where to invest funds, where to buy energy, paying for buildings that are LEED certified, installing geothermal on the Oval, a lot of decisions are about energy and physical operations.

Food:

- The Heirloom Café in the Wexner Center has a local foods focus
- Waterman Farm, a student farm that grows, harvests, and sells its produce as well as composts

Infrastructure:

- There are a lot of people who run the physical place trying to make facilities, operations, and development more sustainable.
- 50 year framework plan for campus.
- The university has a green build policy, and the new buildings have to be LEED certified so they will be more energy efficient, water efficient, and an overall better environment for our students and community.
- There is a campus wide-energy efficiency improvement of all buildings that need it.
  -The additions on South Campus are much more efficient, due to materials and LEED requirements. The new north dorms will be the benchmark of energy efficiency because they're not attached to anything old. There is also the CBEC building, which will have more meters and monitors than any other building on campus.

- Green buildings like the 4H Center

- Green roof on Howlett Hall, the first green roof on campus
- Ideas to make [West] campus into a green campus.
- A lot on the operational side
- The Med Center is incorporating a healing garden with biophilic design

Transportation:

- We have the bus system that I've seen that runs on natural gas or renewables
- More bike trails
- Trying to create a pedestrian-friendly environment.
- A lot of our decisions revolve around the transportation system
- There is the goal to be vehicle free, with an outer belt around campus where parking will be. Ideally it will

be fast enough transportation in for students and people to get to class and work from off campus.
- Woodruff was slimmed to make driving more and more inconvenient.

Waste:

- The Zero Waste effort at the stadium, which diverts 90% of waste generated. That brings sustainability to a hundred thousand people throughout the football season (11)
    - It shows people that OSU is serious about sustainability. It's especially good when people come from all over for the football games, things like Zero Waste become educational tools. If they can see what we're doing and see the impact we're making, that's a good thing.
    - It is becoming a goal for the whole university with classrooms, dining halls, etc. and is also spiraling into the Worthington school district—it has had a ripple effect.
- We're moving now towards more composting opportunities on campus, and composting in one of the dorms as a pilot program.
- Composting in dining halls on campus
- Composting in the Union
- The Union and Kennedy Commons have pulpers for composting, and the Blackwell, faculty club, and Fawcett Center also collect organics.
- The recycling program is visible and organized. There's the all-in-one bins, [and there are recycling bins in offices instead of just trash cans.]
- We have a massive recycling program for a university our size. While we don't recycle everything, just being able to have an all-in-one container is remarkable (2)
- All the containers everywhere are starting to raise awareness among a lot of different populations-- not just students but faculty and staff as well.
- We're working to expand the recycling program and range of numbers accepted on campus (2)
- 100% of the copier paper used by the university contains post-consumer recycled content
- E-steward certification
- I like what OSU is doing in conjunction with the surplus unit on campus.

SOCIAL:

Community Involvement:

- -The university is very involved in Weinland Park (8)
    - the university has a lot of classes which are engaged with Weinland Park and the university district neighborhood
    - I know there is somewhat of a partnership with Weinland park and I get the sense that there are pieces there but my impression is that there isn't a tight link with the campus and the surrounding communities.
    - We do a lot of neighborhood development stuff – the millions of dollars going now to Weinland Park
- Ohio State has made several commitments to the surrounding communities to improve the way of life for our neighbors.
- We also want to be good neighbors, and try to think about how we fit into Columbus, Ohio, the Midwest, etc. Part of that is communicating what we're doing and what we have planned and how we can work together. For example, we worked with the City of Columbus on the city-wide curbside recycling program.
- Ohio State has also developed a partnership with the Ohio Department of Rehabilitation and Correction to support their efforts to reduce recidivism and improve rehabilitation. There are also many programs across campus for community service, diversity, and equity.
- We've had a service learning round table initiative for almost 30 years. A lot of it is educational, so working with various schools in the Columbus system but also neighborhood organizations and community gardens, etc.

- There are a lot of good things happening off campus in addition to the good things happening here.
- A lot of students are doing volunteer work in the community (community gardens, etc.). I think there is a lot being done.
- There are local groups like the community computer lab (which is in a church called 16th and Summit), which is free for anyone who wants to use it.
- I would say also the presence of the university as an employer in the community is a big component of the social justice area because we are providing jobs to the community.

Cultural Diversity:

- The university does a lot in terms of cultural diversity.
- Study abroad —[which exposes] the student population to other cultures and parts of the world and other ways of living.
- USAID Teacher Education Consortium projects in Indonesia and Brazil
- The Global Gateway Offices

Promoting Social Awareness:

- We bring in speakers that relate to the social component like KrochetKids
- Promote social awareness academically, by offering AFAMAST and WGSST classes
- Bucks for Charity (which raises money annually for environmental, health, and human service agencies).

Purchasing:

- The purchasing department requires that 15% of our purchases have to be made from a minority business enterprise. There's also a preference to buy things from Ohio or from states surrounding Ohio. That connects to the local economy and an attempt to improve lives around the area.

FISCAL:

- I don't really know. In my small view, it seems like we're trying to spend more money and build bigger buildings.. I don't know that we're spending money on the sustainability issues.

Reducing Costs:

- Ohio State is investing in several projects that will reduce our costs today on operations.
- At the operations level, we are constantly looking for ways to save the university money and save our energy cost. This benefits us in that it conserves resources for betterment of the environment but also it saves the university dollars.
- Efforts to recycle are saving the university money on fees for waste removal
- Saving money on energy efficiency with building metering and auditing
- Working on surplusing, getting people to reuse things like e-waste
- We are saving money and being wiser about using resources.

MISC:

Administratively

- The One Framework Plan (2)
- The President's Climate Commitment (President Gee signed the Climate Commitment to be climate neutral by 2050) (7)
- The President's and Provost's Council on Sustainability efforts (2)
- AASHE STARS system

- University-wide, there has been an explosion of interest in sustainability
- We won the Enviance award

Research:

- In terms of research, we have faculty from all departments interested in sustainability, so through their own research area they're addressing sustainability, whether from the business side, architecture side, engineering side, humanities side, you name it. Everyone can get involved.
- We have around 400 faculty members doing research across campus that has something to do with energy, the environment, or sustainability. Our goal is to try to mesh those three areas together as much as possible. We think that the issues of energy, environment, and sustainability are broad enough and large enough that we're going to need lots of people from many different backgrounds to work with one another to begin to solve the problems. On our website, we have a database of all of the researchers on campus that we know of. You can search by name and topic and figure out who's doing what and where.
- In terms of research, we are doing as much (or more) as any other place in the world. There are over 400 faculty members that do energy and environment-related research. For example, we have found a way to remove the carbon from coal before it is burned and perhaps even make the carbon a marketable product [instead of a toxic waste product]. We also have faculty members looking at water's use in energy, shale and hydraulic fracturing, etc.
- Students are doing research in the area of technology and e-waste
- There's a lot of good research related to sustainability.
- Byrd Polar Research Center

Student Support/Leadership:

- I think OSU is also doing a good job with developing student leaders and giving students opportunities to practice in whatever areas of sustainability they're interested in. The Coca-Cola grants for sustainability are an example of this. Some of those initiatives include the garden behind the Wexner Center, development of a bike clinic, development of a course for the removal of Honeysuckle along the Olentangy River.
- Coca-Cola student sustainability grants
- We also support student organizations, so whenever they have initiatives we provide staff and whatever assistance they need. The students do a great job with initiatives like dump and run.
- The university also sponsors students to go to conferences (like the AASHE conference in Nashville)
- Some of the student clubs are already integrating and having collaborative meetings amongst clubs so students are making things happen that way.
- Countless student organizations that are environmentally focused and participate in things like Scarlet, Grey, and Green
- There are a number of active student organizations.
- There's a tremendous number of student groups, which makes it evident that this is a big issue and students themselves care and want to do something about sustainability
- Net Impact Certification (2)
- CFAES Sustainability blog
- Earlier this year, OSU got a million dollar grant from the board of regents as a part of a larger program for trying to get internships in Ohio for Ohio students. They engaged 80 companies who said they'd provide 400 internships, and on company time, the students could take 2 online courses. So sustainability is the focus of one of those 10 courses.
- In the EEDS major we have interns working with city hall to start measuring sustainability indicators with city of Columbus, so we're starting partnerships with the city.

HOW CAN STUDENTS GET INVOLVED?

Being aware:

- By doing anything.. [Students can] all make a contribution, no matter their background. Sustainability is about everything. It's fundamentally reorienting the way we live, which requires changes at every level in every field, in everything. Students need to have an understanding of the problems and what we think is needed to start addressing them so that as they pursue a career, they can incorporate that into what they're doing. If we have people dispersed throughout the system who are aware and making small contributions in their own way, then that is what is important.
- Getting involved in sustainability doesn't have to mean joining an organization or becoming an EEDS major or doing a river clean-up. It means learning what you want to learn but understanding enough about the challenges we face when it comes to sustainability to be able to incorporate that when it comes to your career and the way that you live your life.
- I think it's really about speaking up when something feels wrong or you don't know something. In summary: Be curious. Ask questions. Do something. And share it with somebody else. Think critically of your own life; is what you're doing making you happy now and will it make you happy tomorrow? And If it's not, do something differently.
- Another level of involvement would be students working collectively to make system wide changes. Students can also work to change the broader system outside of the university, like the state or the national government laws (Amnesty International is an example of system wide change).
- Demand OSU be greener by raising awareness

- I think if nothing else, the first and most important thing students can do is talk to their friends and neighbors and colleagues about the issues they're interested in. If we come from different backgrounds and talk about a particular issue, we might find common ground, but wouldn't find that unless we engaged in the discussion in the first place. It is important for students to talk to one another to break down those barriers.

Certifications:

- Net Impact Certification (3)
- Work to obtain Green Buckeye Certification for their office/department/unit (2)

Challenges/Competitions: (2)

- [Other opportunities for getting involved include participating in things like] the Solar Decathlon house, the University Business Plan Competition in Fischer, the clean energy student challenge, etc.
- Students work on competitions like EPA P3 (student design competition for sustainability) and rainworks challenge

Chosen area of study:

- Major or minor in something related to sustainability
- EEDS (3)
- Look at your courses and figure out ways to incorporate and work on sustainability issues as much as possible.
- Various classes that are engaged in sustainability (5)
    - such as ENR 2367, ENR 3470, HCS 5194, environmental justice courses, etc.
    - Students can take ENR 2367, where students put together sustainability projects and present them in front of key sustainability officials at the university. Students have the opportunity to try and implement the projects at the end of the course.

- Regardless of what they're doing, they can challenge themselves about how to integrate sustainability principles into whatever they're passionate about and chose to eventually study and work on.
    - Students should be putting pressure on their faculty and advisors. I don't care if they're science or engineering or math or dance. Students need to ask their professors "where's the sustainability of the thing you're teaching me? How can I make this career more sustainable?"
    - If you're an architecture student, how can you bring sustainable design into your architecture? If you're a city planner, how do you plan sustainably?
- Ask professors to focus their research papers, projects, etc. on sustainability
- Participate in Capstone programs (2)
- Through a GE
    - the information would get to students from all over the place who wouldn't otherwise know about environmental things.
- SENR sustainability study abroad program
- There's been a lot more activity at the intersection of voluntary and academic. I think activities that try to connect academic programs to professional development are really healthy and really useful.
- Co-curricular activities
- ENR Scholars
- Discovery themes (sustainability is a huge part of that)

Classes: (3) (faculty-initiated)

- Through discussing sustainability in classes
    - you can tell students to volunteer but they don't really know what to do from there unless you bring them together as a group and show them all the things that they can do and let them choose. So, I think classes are a great way to reach them.
    - I think having groups talk in classes is important. Teaching students about innovations and what people are doing is important so that they know how to get involved. I think the best way to do that is through a class that they have to show up to.
    - you could incorporate the concept of sustainability into a couple of GE classes as a section or two and I think you would get more students that way (as opposed to starting a new class). We already have the student base, so we should probably just take the things that are working now and work sustainability into them.

Community Involvement:

- Look locally-- find out what's happening in your institution. E-waste is a big part of our education, regardless of what discipline. People should know more about what OSU is already doing, and they should also be thinking about what they could do next and in addition. The process for capturing the fine earths is really awful-- a horrible mining process that requires tons of ore for small amounts of final product.
- Environmental organizations in the community; get off campus. Nearly every environmental organization has a local chapter and there are others like The Highlands Nature Sanctuary and the Metroparks, all with very different kinds of missions.
- Students could be more active in their community.
- I think it's important to connect with your peers and your community. So do things that bring you closer to your neighbors

Events/Talks:

- Attending seminars and talks
- Attending lectures that occur on campus (for example, SENR seminar series)

Internships:

- Internships working with organizations outside of OSU to help students get involved and prepare for a career.
- Getting involved through an internship that's somehow related to sustainability
- Students can also work directly in ESS or in OEE, or can be paired with faculty interested in energy and the environment.
- [There are also involvement opportunities outside of OSU]; for example, some students are working at the city of Columbus Mayor's Office of Environmental Stewardship.

Lifestyle Choices:

- I want students to see the bigger picture. Don't buy a new product because it's battery powered when you have one that already works. Recycling ends up being the solution then, because it's something we can do, but it's superficial because it's only a small part of a large solution. I'm not saying not to recycle, I'm just saying that recognizing the life cycle of a product is important and students should realize that recycling is only a small piece. It's lifestyle choices that are the big things.
- They can participate directly through the choices that they make, by taking shorter showers or limiting electricity use.
- Simply do their part by recycling and being good environmental citizens
- Consumption (3)
    - Making consumer decisions according to your values. Ex) using certification systems
    - I think the best way to get involved is through consumerism, because we do it on a daily basis. Engaging in sustainability through making better choices like reusing stuff, shopping at thrift stores, etc
    - To live in the most environmentally sustainable way, one thing you can do is reduce consumption of all products
- Asking what is in our investment portfolio, how much are we invested in green things, how much are we not, and how could we do better?

Research:

- Research in energy, the environment, or sustainability (3)
    - OSU, unlike most universities, encourages and enables a vast amount of undergraduate research. The Buckeye Bullet is the premier example. Students representing a diversity of backgrounds were responsible for designing it, building it, funding it, and getting their sponsors.
    - Many professors are open to taking on students as interns or research assistants
- Coca-Cola grants for sustainability (3)
    - if you're interested, you apply and we select 3-4 and they get the funding.

Student organizations: (15)

- (The Sierra Club, Growing Green, Engineers Without Borders, Ecological Engineers, Net Impact, USG Sustainability Committee)
    - Students can search the Ohio Union website and the OEE website and talk to people to find out if there are different groups on campus that are doing things they're interested in. The count this semester is around 80 student organizations that are related to the energy, environment, or sustainability conversation.
    - One thing we've been trying to encourage students to do is to not re-invent the wheel; instead, find the wheels we have and work with them. Students increase their power and effectiveness by working together.
    - If students don't want to join a group and they don't want to do a specific research project or are unsure, they should just go to some meetings and events and hang out and listen and absorb what's going on. There is a lot to be gained just from being a participant in things.
- Student farm , part of which is student run, so students who are interested in food issues and agriculture can get involved.

- I feel like the most effective things that students will do are participating in things where you're doing good stuff: growing food, teaching life skills, and actually doing it all at a local level (Growing Green). So when you do other things in life you're drawing on an experience base and it's more meaningful.

Volunteer opportunities:

- Pay it Forward
- BuckiServe
- River Clean-Ups
- Local Matters
- Service Learning Projects
- The Zero Waste Initiative (4)
- Residence halls provide a good opportunity for involvement
- Green representative in each of the residents halls

WHAT COULD OSU BE DOING BETTER?

-Campus as a Living Laboratory (2)

- I think the campus could be used as a living laboratory a little better because there are some neat things that are happening like the rain gardens and green roof that a lot of students don't know about.
- Campus as a living laboratory should work to remain on campus so that students have the opportunity to understand the nuts and bolts of facilities and operations.

Summary: Better utilize the concept of Campus as a Living Laboratory

-Communication and Promotion of Sustainability Efforts (12)

- I think we are doing very well with working together, so I'd just say it's important to continue doing that.
- Making sure that we always have a clear, concise message to students needs to be an ongoing goal.
- I think Ohio State could do a better job at demonstrating the connection of its many programs and initiatives to "sustainability"
- OSU is still in an early stage of learning how to take an integrated approach to sustainability. Efforts are fragmented across different colleges.
- I don't know if we tell in a unified voice all the things that we're doing related to sustainability or the environment. There's a lot of great stuff going on and I don't know that it's been talked about in the right way to get students interested and understanding of what's going on at OSU.
- I think we have this multi-headed monster. There are all these things happening and I have a hard time even knowing what exactly we're doing. One office has sustainability in the title, and so does another, but not another. In terms of what's out there, I'm massively confused, and I feel like the emphasis is not always in the place that it should be. So making it clear who's who and how to connect.
- OSU would benefit from a genuine trans-disciplinary initiative that would encourage integrated education and research in sustainability.
- There have been interesting individual initiatives, but for the most part, they're not tied together or understood as part of a larger sustainability commitment.
- I don't think we're very good yet at taking a truly broadly interdisciplinary academic approach; we're still more silo-d with the problems which respect none of our disciplines.
- There is no question that among individual departments, units, and researchers, people are making contributions. But as an institution, we haven't managed to connect the operational, academic, research, and educational aspects of sustainability together.
- Where do I think we're not *trying* to do enough? I really think it would be in the integration of the

three (environmental, social, and fiscal).

- The single most important thing we can do to improve is to communicate better. So not just communicate to the world what we're doing, because we do a good job of that, but we have to communicate with one another. As a university we should be doing better to communicate with students about what we're doing. Being able to communicate with students, the surrounding community, and also with ourselves is critical.
- Better integration between the sustainability office and the students on the education side.
- There isn't that much of a coherent vision for how [sustainability in the curriculum] should work or how students can find that. But that's typical of OSU; as big as we are, you have everything and no one can find it.
- Most students don't know about the wetlands facility or the student farm, so no one goes over there. OSU is at fault there, because the students don't know. We don't seem to promote those things as much as we could.
- I think the campus could be used as a living laboratory a little better because there's some neat things that are happening like the rain gardens and green roof that a lot of students don't know about.
- Ultimately, I just think students need to see more examples of things we practice and be able to take part in them.
- It seems like some stuff isn't located where it should be, for example the Office of Energy and Environment. It seems hidden away and we need to make things more prominent.
- I think that academic leadership could do more to promote academic work that has a focus on sustainability, both faculty research and courses for students. And faculty could make those choices for themselves as well.
- The One Planet banners that they had created last year should be on every light pole. On the signs where you enter the campus from a public street, there should be something about sustainability on those signs to help brand the university (maybe they could use the One Planet branding?). We need to remind people more and make it top of mind.
- You have to show people how sustainability works because it's just a word that people don't understand. We need to have big projects always going on so people can see them, and it would be nice if students could get involved, like how they have students involved in Zero Waste, so that they have ownership of it.

Summary: OSU could do a better job at promoting its many programs and initiatives and then demonstrating in a clear way their connection to a larger sustainability commitment. There is no question that among individual departments, units, and researchers, people are making contributions-- but as an institution, we haven't managed to connect the operational, academic, research, and educational aspects of sustainability together.

-Community Involvement/Social/Environmental Justice (5)

- I think OSU is internally focused, and not really concerned with the communities around the area, but they have a really strong impact-- they need to be able to do both.
- The concept of integrating sustainability into surrounding areas could also be improved; we could do a better job at focusing on who is outside the borders of the university. We should be thinking in a more programmatic way about how we could reach beyond our borders to make sustainability happen in a systematic fashion. So things like the work in Weinland Park, or working with the City of Columbus to develop a partnership on sustainability issues. We need integrative collaboration between researchers and policy makers to make that stuff happen.
- There's a lot of concern with issues of cultural and social justice on campus but not much of it specifically embraces issues of environmental justice that I am aware of, or that encompasses other species in any discussion of justice
- I don't think of OSU as having done too much in terms of social stewardship/justice.
- The social stewardship and environmental justice aspects do need to be improved. We need to get involved more deeply in community work, enhance our social fabric and be in tune with the social community and our surroundings.. it really is important (and possible) for students to get involved.
- OSU is doing better in stewardship of the physical campus than in stewardship of its intellectual and community assets.

Summary: The concept of environmental justice and integrating sustainability into surrounding areas could be improved; we could do a better job at focusing on who is outside the borders of the university, by getting more deeply involved with community work and enhancing our social fabric.

-Critical Thinking (1)

- [In the discovery themes we define sustainability] in ways that don't question what it is that we're sustaining perhaps as critically as that might be questioned.

Summary: We should be questioning more often what it is that we're sustaining.

-Embracing Sustainability Culture (5)

- At OSU, we have signed on verbally to the sustainability discourse, but the practice has lagged way behind-- we haven't internalized it, really.
- We have to get to that tipping point where sustainability is our culture, we aren't there yet.
- Instead of just meeting the bar, we need to exceed the bar, or even establish new bars. Based on expertise and research, OSU could be a leader in developing the next set of standards of sustainability. And it's not all just about energy and resource efficiency, which is a lot of what it focuses on currently (reducing waste and level of energy)-- it's also about sustainable consumerism and thinking about our own lifestyle changes and choices. Everyone can agree we need to be more efficient, but to decrease our scale is a different conversation. Everyone doesn't agree on the scale and the equity dimensions like they do on efficiency, but sustainability does push us in a direction of smaller scale and more equity. OSU should be a leader in those two aspects.
- What we need is a dynamic for change, which means that we need models and to think about crossing boundaries and we need a deliberative context for making sustainability decisions. Deliberative context means [that] there are alternative pathways that we can follow, so we are presented with a set of choices, and rather than saying "here is the sustainability plan for OSU," you'd have several scenarios and teams of people to determine these scenarios. Those alternatives would be public, and part of the mission of the university would be to foster the social, analytical, and political skills for deliberating about the alternatives.
- If we show that what we have here now is good and we can make it work and we don't have to keep building bigger and expanding, that would really encourage sustainability.
- The notion of adaptive management, where you try something and you learn from it and you test things out. That is a model that we haven't internalized, and that's something that needs to happen, not just in wildlife management or restoration work but deeply in social institutional terms as well.
- Divestment would be helpful, since it's really leveraging our consumer power.

Summary: Instead of just meeting the bar, we need to exceed the bar, or even establish new bars; OSU could be a leader in developing the next set of standards for sustainability. We have signed on verbally to the sustainability discourse, but we haven't internalized it, really. We need to get to the point where sustainability is our culture.

-Energy (1)

- I think we could always be working towards shying away from "Big Energy"

Summary: I think we could always be working towards shying away from "Big Energy"

-Green Space (1)

- More green space would be good.

Summary: It would be good to have more green space.

-Institutionalizing Sustainability into the Curriculum (11)

- Maybe a goal would be to identify some areas that would have the greatest impact on sustainability (engineering, architecture, city and regional planning-- those are all areas that are doing things that have a big impact on sustainability outcomes) and build sustainability into their curriculum a bit better.

- Integrate sustainability into teaching university-wide. For example, take engineering students and have them consider greenhouse gas emissions from an engineering perspective.
- I think the ideal thing would be that sustainability is a component of courses taught in all different majors. So if you're an architecture student, you have a class on sustainability and it ends up being a piece of all of your courses. That requires hiring faculty with that mindset that can integrate sustainability into their teachings and put that process together.
- The university can improve sustainability by providing opportunities for sustainability education to students. There's a percentage that might change their activities and the way that they do them if given the knowledge and information.
- My hope is that a curriculum could eventually be developed with some commonalities and philosophies that we can approach so sustainability could be applicable to different people in different areas.
- Putting something like a multidisciplinary seminar in open the option category would be good.
- Getting it institutionalized into the curriculum is the important piece (2)
- Maybe create a capstone that is synthetic and lets us look at behavioral problems versus structural problems. This could address the approaches to achieve goals, as well as understand structural and economic issues.
- There are very few [programs] that incorporate the arts and humanities, which I think are a big part of people's engagement with their environment and the vision for what they think their environment would look like. We have a number of units that do a pretty creditable job at bringing together the environmental and social sciences but we don't have anything that brings in the arts and humanities.
- A General Education course
    - The next step has to be a General Education requirement where every student is required to take one sustainability course out of a handful.
    - A sustainability GE. Students will never get everything in one class, but that's true with any subject. It's important to have a start, something to build from, something to incorporate into what they're studying and how they're living. They need to be getting it everywhere-- teaching sustainability needs to be a community effort.
    - It would be great if we get a sustainability requirement in the curriculum.
    - We're doing a lot— within our own silos we talk about sustainability but I think there's a huge opportunity that's missed in terms of the bigger picture. We're not doing enough— we have good intentions but the roadblocks of a GE class are getting in the way of important things happening.
    - The biggest impact we can make is through the students. If you have a GE where you talk about integration and every student has some background knowledge and appreciation for sustainability, that's a huge impact. So teaching students how they personally impact sustainability and how they can mentor and guide others back to world sustainability.
    - A GE would be helpful. If we want people to be sustainable and move our world forward, we need a little education at least.

Summary:

- Integrate sustainability into teaching university-wide, so that sustainability is a component of courses taught in all different majors.

-A General Education course or a multidisciplinary seminar related to sustainability would be helpful.

-International Involvement (2)

- I think the biggest opportunity now is through online education and having a mechanism for allowing people in the developing world to have access to higher education. We are here to be creating and disseminating knowledge for the good of everybody.
- There is a real opportunity to have a bigger international presence [in outreach and involvement]

from a social and environmental justice perspective.
- The international study abroad programs could be better focused on sustainability.

Summary: There is a real opportunity to have a bigger international presence, for example providing online education to those in the developing world, focusing international study abroad programs more on sustainability, more international outreach in terms of environmental justice, etc.

-Policies (1)

- We've been doing behavioral change stuff for 30-40 years, so clearly that's not going to work. Instead, we need to change the rules. For example, creating policies that require we reduce the waste stream of a residence hall by a certain amount [rather than relying on behavioral change].

Summary: Instead of relying on behavioral change, we need to change the rules. For example, creating policies that require we reduce the waste stream of a residence hall by a certain amount.

-Student Involvement (5)

- It would be helpful to provide more funding for student groups that are interested in sustainability so that they could put on events and raise awareness.
- It would be useful to employ some kind of faculty liaison to help students in different areas with their sustainability projects
- We need to give each student an opportunity to engage in extracurricular, co-curricular, and curricular activities before they graduate.
- Our goal is to start to encourage students to communicate with one another. The idea is, one: we have to create situational awareness so they know what's going on, two: encourage them to talk to one another about what they want to do, and three: help them with whatever they need to do what they want to do.
- A service requirement for students. Perhaps require students to get involved in the neighborhood and surrounding schools and provide several categories to choose from, and have sustainability be one of them.
- In the dorms, students don't get the price signals to decide to change their behavior, so the university should create some kind of incentive for students. For example, some of the dorms could get a measuring device so students can know how much energy they're using.
- Students should be more involved in seeing how high level decisions are made and the calculations that go into them.
- I'm not so sure students are advocating and organizing as effectively as they could to hold the administration's feet to the fire on this stuff. I don't necessarily think people are resisting, we accept things the way they are.

Summary: Facilitating Student Involvement ex) Providing more funding for student groups, employing a faculty liaison to help students with their sustainability projects, making a sustainability service requirement for students, etc.

-Transportation/Infrastructure (5)

- We should encourage alternative modes of transportation-- do we really need as many cars as we have on campus? We should encourage more biking, less driving, less parking, and less pollution.
- We can be working better in the realm of transportation and infrastructure. The university can be implementing initiatives to help improve building standards and doing things to make it safer and easier to ride bikes.
- One thing we do a really poor job of here is transportation. We should work with the city better to integrate the bike and bus systems; there are a lot of neighborhoods that could be better connected to campus.

- There could be more preferred/convenient parking spaces for low emission vehicles (like they have in the garage next to Fisher). We could reserve something like the ten spaces closest to the door for low emission vehicles.
- We could challenge ourselves in terms of physical development and infrastructure

Summary:

-We should encourage alternative modes of transportation, i.e. work with the city better to integrate the bike and bus systems

-We could challenge ourselves in terms of physical development and infrastructure

-*Waste (2)*

- Better signage on the trash cans and recycling bins. We still have a ways to go with trash cans in the rooms-- who knows what's recyclable? Not everything in Columbus is recyclable, let alone here. They're working hard at it, though.
- I think the greatest problem now is with personal e-waste items, so trying to find a functional way to get rid of my 4 cell phones that sit at home. OSU should develop a robust personal e-waste management system for OSU people and invite the communities around us to be engaged in that.

Summary: There could be better signage on the trash cans and recycling bins. There should also be a personal e-waste management system for OSU.

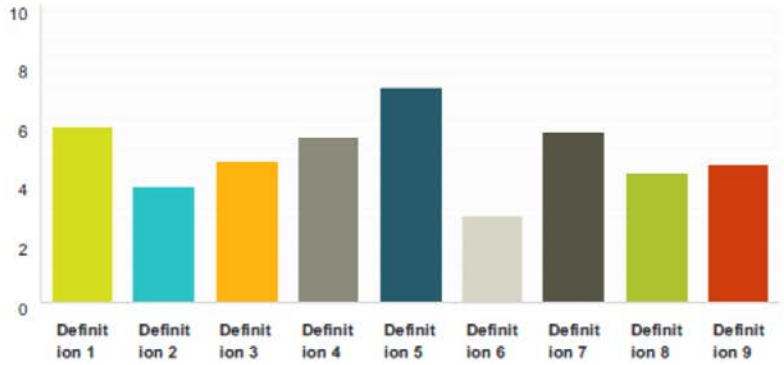
APPENDIX D:

Full Survey Results

Sustainability Curriculum Content

Q1 What is your personal definition of "sustainability"?

Answered: 11 Skipped: 0

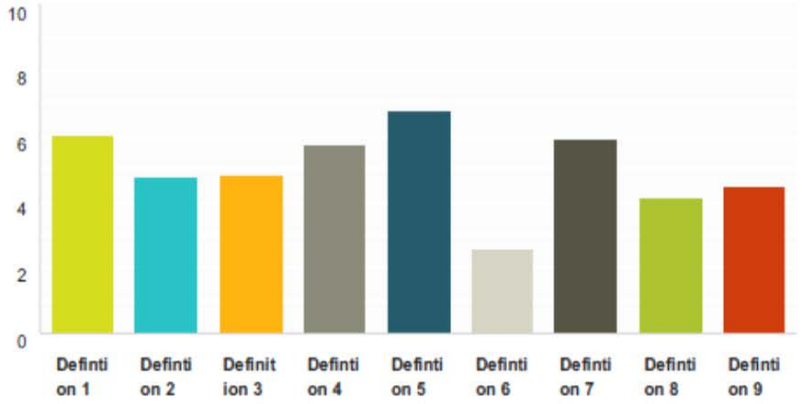


	1	2	3	4	5	6	7	8	9	Total	Average Ranking
Definition 1	36.36% 4	0.00% 0	9.09% 1	9.09% 1	9.09% 1	18.18% 2	0.00% 0	9.09% 1	9.09% 1	11	5.91
Definition 2	9.09% 1	0.00% 0	9.09% 1	9.09% 1	9.09% 1	9.09% 1	9.09% 1	36.36% 4	9.09% 1	11	3.91
Definition 3	0.00% 0	9.09% 1	18.18% 2	9.09% 1	18.18% 2	9.09% 1	18.18% 2	18.18% 2	0.00% 0	11	4.73
Definition 4	0.00% 0	18.18% 2	9.09% 1	27.27% 3	27.27% 3	0.00% 0	9.09% 1	9.09% 1	0.00% 0	11	5.55
Definition 5	27.27% 3	36.36% 4	9.09% 1	0.00% 0	18.18% 2	9.09% 1	0.00% 0	0.00% 0	0.00% 0	11	7.27
Definition 6	9.09% 1	0.00% 0	0.00% 0	0.00% 0	0.00% 0	27.27% 3	9.09% 1	18.18% 2	36.36% 4	11	2.91
Definition 7	9.09% 1	9.09% 1	27.27% 3	18.18% 2	9.09% 1	9.09% 1	9.09% 1	0.00% 0	9.09% 1	11	5.73
Definition 8	0.00% 0	9.09% 1	18.18% 2	9.09% 1	0.00% 0	18.18% 2	27.27% 3	9.09% 1	9.09% 1	11	4.36
Definition 9	9.09% 1	18.18% 2	0.00% 0	18.18% 2	9.09% 1	0.00% 0	18.18% 2	0.00% 0	27.27% 3	11	4.64

Sustainability Curriculum Content

Q2 What is your personal definition of "sustainability"?

Answered: 11 Skipped: 0



	1	2	3	4	5	6	7	8	9	Total	Average Ranking
Defintion 1	36.36% 4	0.00% 0	0.00% 0	36.36% 4	0.00% 0	9.09% 1	0.00% 0	0.00% 0	18.18% 2	11	6.00
Defintion 2	0.00% 0	27.27% 3	0.00% 0	0.00% 0	18.18% 2	18.18% 2	27.27% 3	0.00% 0	9.09% 1	11	4.73
Definition 3	0.00% 0	18.18% 2	9.09% 1	9.09% 1	18.18% 2	9.09% 1	18.18% 2	18.18% 2	0.00% 0	11	4.82
Defintion 4	0.00% 0	27.27% 3	9.09% 1	18.18% 2	18.18% 2	18.18% 2	0.00% 0	9.09% 1	0.00% 0	11	5.73
Defintion 5	36.36% 4	0.00% 0	27.27% 3	9.09% 1	9.09% 1	9.09% 1	0.00% 0	9.09% 1	0.00% 0	11	6.73
Defintion 6	9.09% 1	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	27.27% 3	27.27% 3	36.36% 4	11	2.55
Defintion 7	9.09% 1	18.18% 2	18.18% 2	9.09% 1	27.27% 3	0.00% 0	9.09% 1	9.09% 1	0.00% 0	11	5.91
Defintion 8	0.00% 0	0.00% 0	18.18% 2	18.18% 2	0.00% 0	27.27% 3	9.09% 1	9.09% 1	18.18% 2	11	4.09
Defintion 9	9.09% 1	9.09% 1	18.18% 2	0.00% 0	9.09% 1	9.09% 1	9.09% 1	18.18% 2	18.18% 2	11	4.45

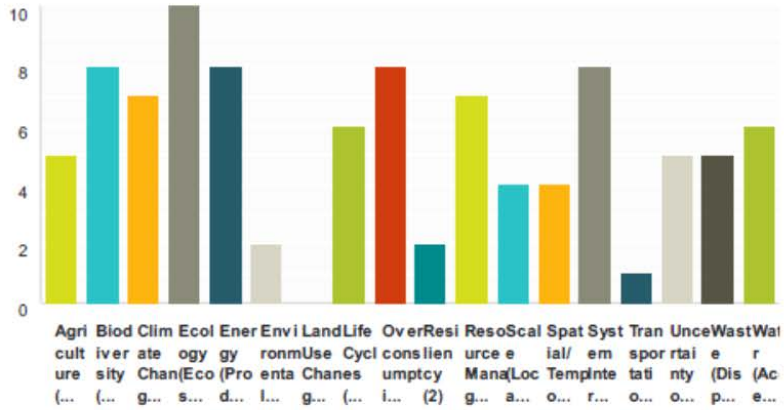
Q3 **As an extension of Question 2, please indicate your absolute threshold of definitions to be included in the curriculum. For example, if you think your top four are of similar or equal weight and absolutely must be included in the curriculum, please list your threshold as 4. If all nine are imperative, please list your threshold as 9. If there is one definition that you think captures your idea of sustainability sufficiently, please list your threshold as 1. You may use this space to provide additional feedback as well.**

Answered: 11 Skipped: 0

Sustainability Curriculum Content

Q4 What do you think are the most important tenets of environmental stewardship?

Answered: 11 Skipped: 0

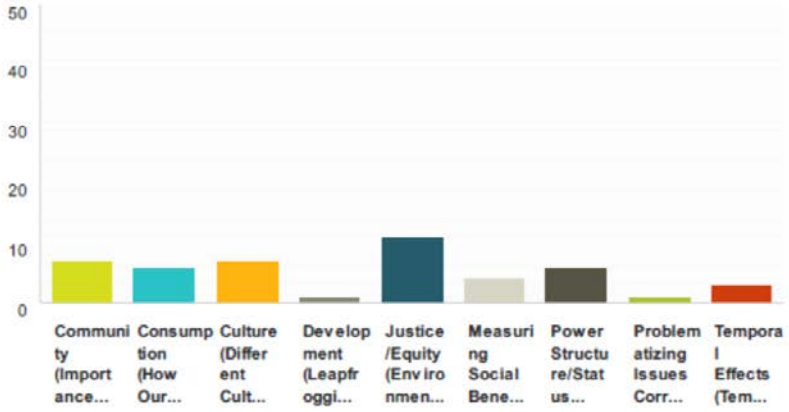


Answer Choices	Responses	
Agriculture (Pollution, Runoff, Food Production/Access, etc.) (3)	45.45%	5
Biodiversity (Trophic Levels, Species Interactions, etc.) (3)	72.73%	8
Climate Change (4)	63.64%	7
Ecology (Ecosystem Services, Ecological Bottom Line, Cycles, etc.) (7)	90.91%	10
Energy (Production, Extraction, Use, Alternatives, etc.) (5)	72.73%	8
Environmental Sensitivity (Empathy/Connection for/to Nature) (1)	18.18%	2
Land Use Change (1)	0.00%	0
Life Cycles (Where Products Come From/End Up) (4)	54.55%	6
Overconsumption (Consumer Culture, Buying Local, Planned Obsolescence, etc.) (3)	72.73%	8
Resiliency (2)	18.18%	2
Resource Management (Sustainably Managing Resources, Tragedy of Commons, etc.) (2)	63.64%	7
Scale (Local, Regional, and Global Environmental Processes) (1)	36.36%	4
Spatial/Temporal Effects (Locational Footprints, Short/Long Term Analysis) (3)	36.36%	4
System Interconnections (4)	72.73%	8
Transportation (1)	9.09%	1
Uncertainty of Systems (Tipping Point, Thresholds, Cascading Effects, etc.) (5)	45.45%	5
Waste (Disposal, Recycling, Compost, etc.) (4)	45.45%	5
Water (Access, Cost, Runoff, Pollution, etc.) (4)	54.55%	6
Total Respondents: 11		

Sustainability Curriculum Content

Q5 What do you think are the most important tenets of social stewardship?

Answered: 11 Skipped: 0

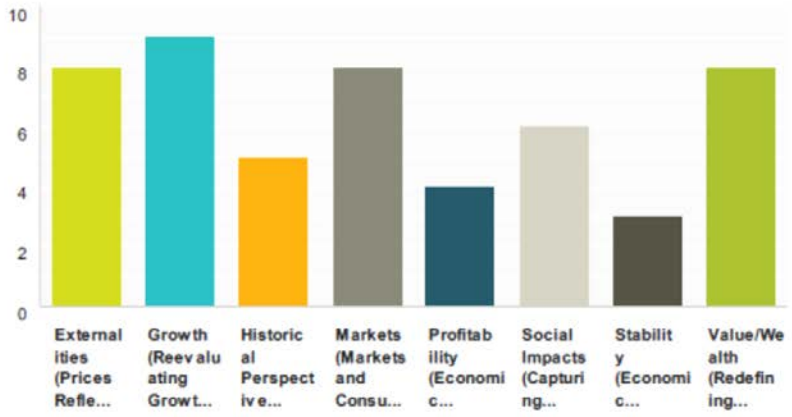


Answer Choices	Responses	
Community (Importance of Community/Building Strong Communities) (3)	63.64%	7
Consumption (How Our Consumption Affects Others) (1)	54.55%	6
Culture (Different Cultures Perceive Sustainability Differently) (2)	63.64%	7
Development (Leapfrogging) (1)	9.09%	1
Justice/Equity (Environmental Justice, Social Justice, local and international examples, etc.) (13)	100.00%	11
Measuring Social Benefits (Social Benefits Can Outweigh Economic Losses) (1)	36.36%	4
Power Structure/Status (Political Economy, Fundamental Cause Theory, etc.) (4)	54.55%	6
Problematizing Issues Correctly (1)	9.09%	1
Temporal Effects (Temporal Difference Between Actions and Impacts, Time Discounting) (2)	27.27%	3
Total Respondents: 11		

Sustainability Curriculum Content

Q6 What do you think are the most important tenets of fiscal stewardship?

Answered: 11 Skipped: 0

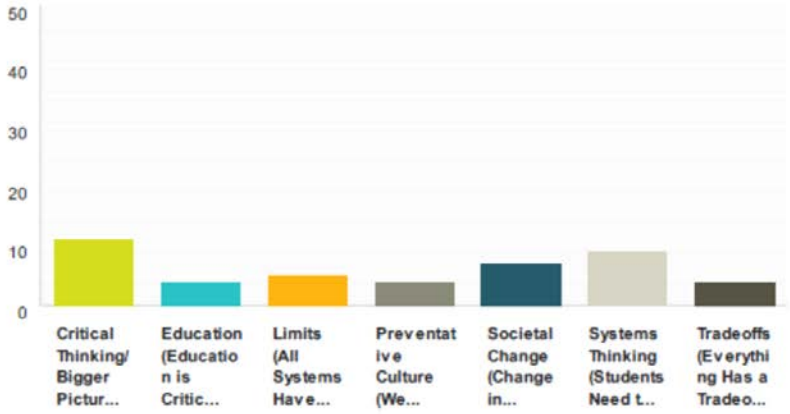


Answer Choices	Responses
Externalities (Prices Reflecting Total Cost, Properly Valuing Resources, Price Signals, Internalizing Externalities, etc.) (6)	72.73% 8
Growth (Reevaluating Growth and Progress) (3)	81.82% 9
Historical Perspective (History of Capitalism, Corporations as People) (1)	45.45% 5
Markets (Markets and Consumer Incentives, Redistributive Mechanisms, Subsidies, Cap and Trade, Rebound and Substitution Effects) (3)	72.73% 8
Profitability (Economic Sustainability Means Long Term Profitability) (1)	36.36% 4
Social Impacts (Capturing Social Welfare in the Market, Effect of Externalities on Social) (2)	54.55% 6
Stability (Economic Sustainability Means Impervious to Market Fluctuations) (1)	27.27% 3
Value/Wealth (Redefining Wealth, Valuing Social and Environmental Factors Equally) (2)	72.73% 8
Total Respondents: 11	

Sustainability Curriculum Content

Q7 What do you think are the most important tenets for sustainability as a whole?

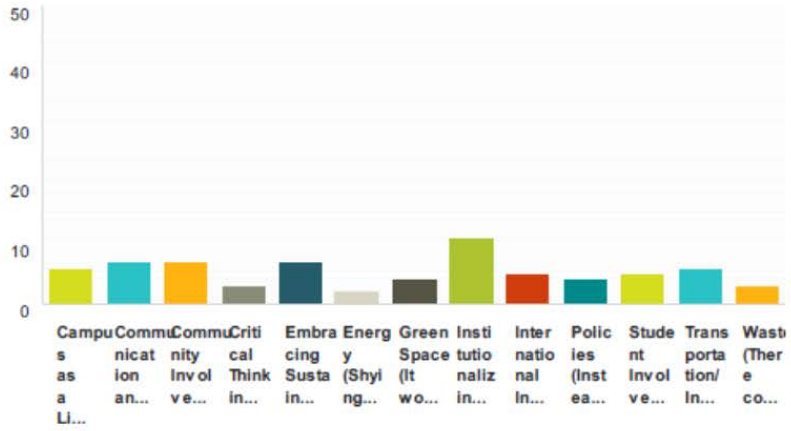
Answered: 11 Skipped: 0



Answer Choices	Responses
Critical Thinking/Bigger Picture (Critically Assessing Claims, Looking at the Bigger Picture, Paying Attention to the Impact of Your Actions, Recognizing Challenges of Sustainability– It Is Not All Black and White) (9)	100.00% 11
Education (Education is Critical to Advance Sustainability Efforts) (3)	36.36% 4
Limits (All Systems Have Limits, None Are Inexhaustible) (2)	45.45% 5
Preventative Culture (We Should Apply the Precautionary Principle Instead of Only Ever Reacting to Crisis) (3)	36.36% 4
Societal Change (Change in Society/Thinking is Necessary for Sustainability) (1)	63.64% 7
Systems Thinking (Students Need to Think of the System as a Whole, Everything is Connected) (4)	81.82% 9
Tradeoffs (Everything Has a Tradeoff, Everything Cannot be Equally Traded) (2)	36.36% 4
Total Respondents: 11	

Q8 What do you think OSU could be doing better in terms of sustainability?

Answered: 11 Skipped: 0



Answer Choices	Responses
Campus as a Living Laboratory (OSU could better utilize the concept of Campus as a Living Laboratory) (2)	54.55% 6
Communication and Promotion of Sustainability Efforts (OSU could do a better job at promoting its many programs and initiatives and then demonstrating in a clear way their connection to a larger sustainability commitment) (11)	63.64% 7
Community Involvement/Social/Environmental Justice (The concept of environmental justice and integrating sustainability into surrounding areas could be improved; we could do a better job at focusing on who is outside the borders of the university, by getting more deeply involved with community work and enhancing our social fabric) (4)	63.64% 7
Critical Thinking (We should be questioning more often what it is that we're sustaining) (1)	27.27% 3
Embracing Sustainability Culture (Instead of just meeting the bar, we need to exceed it; OSU could be a leader in developing the next set of standards for sustainability. We have signed on verbally to the sustainability discourse, we just need to get to the point where sustainability is our culture) (5)	63.64% 7
Energy (Shying away from Big Energy) (1)	18.18% 2
Green Space (It would be good to have more green space) (1)	36.36% 4
Institutionalizing Sustainability Into the Curriculum (We should integrate sustainability into teaching university-wide, so that sustainability is a component of courses taught in all different majors. A General Education course or a multidisciplinary seminar related to sustainability would be helpful) (11)	100.00% 11
International Involvement (There is an opportunity to have a bigger international presence, for example providing online education to those in the developing world, focusing international study abroad programs more on sustainability, more international outreach in terms of environmental justice, etc.) (2)	45.45% 5
Policies (Instead of relying on behavioral change, we need to change the rules. For example, creating policies that require we reduce the waste stream of a residence hall by a certain amount) (1)	36.36% 4
Student Involvement (We should work on facilitating student involvement ex) providing more funding for student groups, employing a faculty liaison to help students with their sustainability projects, making a sustainability service requirement for students, etc.) (5)	45.45% 5
Transportation/Infrastructure (Challenging ourselves in terms of physical development and infrastructure, and encouraging alternative modes of transportation) (5)	54.55% 6

Waste (There could be better signage on the trash cans and recycling bins. There should also be a personal e-waste management system for OSU) (2)	**27.27%**	3
Total Respondents: 11		